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A CASE OF MULTIPLE FIBROMATA OF THE NERVES, WITH ARTHRITIS DEFORMANS.[1]

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AND

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CLINICAL HISTORY (Dr. Preble). Patient, female, J. S., aged thirty-five years. Comes from a family whose history presents nothing of interest, especially is there no history of any tumors in any way resembling the tumors presented by the patient. When very young, a tumor appeared on the forehead and grew slowly until the resulting deformity led to efforts of removal by some sort of a morcellating operation. Shortly after this other tumors appeared irregularly and in great numbers over the entire body.

The personal history gives nothing else of interest until young womanhood is reached, when the patient begins to suffer from pain and weakness, which gradually increased until they caused complete disability. She gives a history of a complete paraplegia without bladder or rectum disturbances. From the history given I am inclined to believe that the paraplegia was hysterical.

Some years after the appearance of the tumors, but just when the patient cannot recall, she began to show the beginning of the joint changes which are now so marked. These consist of swelling and deformity, but there is not much pain. The joints first and most involved were the small joints of the hand ; the changes began symmetrically.

The tumors have not caused much disturbance as a rule, only a few of them having been painful. The patient states that they have varied in size from time to time, and that some of them have entirely disappeared spontaneously. Two years before I saw her a tumor on the left thigh ulcerated, and in spite of every treatment has never healed.

When first seen, in 1894, the patient complained of abdominal pain, described as drawing in character and tending constantly to pull her forward. She complained also of pain in her legs and feet. It was difficult for her to get from her bed to her chair, and walking was impossible. The ulcer on the thigh was painful.

EXAMINATION. Small, emaciated and deformed woman ; mind is clear ; intelligence fair, although she is irritable and unreasonable. The skin is pale without any areas or flecks of pigmentation. It is marked by many tumors, which vary in size and appearance. On the forehead are small tumors up to the size of a small bean, arranged in irregular and tortuous strings, so that they give through the skin a sensation not unlike that of a scrotal varicocele. They are not painful or tender. They extend not only across the forehead, but back, also, into the hair. There are other tumors on the face, but none presenting this racemose arrangement. The tumors of the skin over the neck, body, and limbs vary in size from a large pinhead to the size of a nut. Some are sessile, some are pedunculated. They are covered usually by a thin and wrinkled skin, although some of them are quite smooth and shiny. None are pigmented or hairy ; none are painful.

In the deeper parts we find fusiform or ovoid tumors arranged parallel to the long axis of the neck or limb. They permit of lateral but not longitudinal motion. They are not attached to the skin, and are not painful, with the exception of one in the neck.

On the posterior surface of one thigh is an ulcer half an inch in diameter and more than that in depth, with sharply cut borders. It exactly resembles the perforating ulcers of tabes.

The hands are greatly deformed ; deformity is symmetrical, which began in the small joints. The joint surfaces are destroyed and the capsules greatly relaxed. The resulting deformity is as great but not exactly like the deformity seen in well-marked arthritis deformans. The wrist-joints are similarly affected, the knee and hip-joints are ankylosed, the motion of the jaw is limited, and there is considerable deformity of the spine.

The organs of the thorax and abdomen are normal ; the blood shows merely a moderate degree of anæmia ; pelvic examination under anæsthesia shows a virgin uterus, and high up in the pelvis there are tumors resembling those on the limbs.

The nervous system presents no alterations whatever. All the cranial nerves are in perfect condition ; all the elements of the sense of touch are perfect. There are no paralyses ; the leg reflexes cannot be examined because of the ankylosed joints.

As time went on the patient became gradually worse, and the deformity of the spine rapidly increased until the chin almost came in contact with the pubes. She continued to amuse herself as she had for years by making little trinkets and fancy articles, doing this in spite of the deformity of the hand. The pain in the abdomen and the legs continued ; no paralyses or disturbances of the bladder or rectum appeared. About ten days before death gangrene of the toes of the left foot appeared. Death occurred without any apparent definite cause.

POST-MORTEM EXAMINATION (Dr. Hektoen). Female body, five feet three inches, slight rigor, extreme and uniform emaciation ; the body is greatly deformed on account of a marked kyphoskoliosis, whose greatest curve lies in the lumbosacral spine, with its convexity to the right

and backward ; in the cervical region is a smaller curve with the convexity to the left. The knee-joints are fixed at right angles, and the head of the tibia partly dislocated backward. Both hip-joints are immobile, and the thighs are flexed on the abdomen. The shoulder and elbow-joints are stiff. The left wrist-joint and the right ulnocarpal joint are apparently completely disorganized and flail-like ; also the joints of the thumbs, the distal phalanges of which are flexed outward at right angles. There is palmar dislocation of all the phalanges of both hands, more marked in the left. The phalangeal joints of the first and fourth fingers of the right hand are flail-like—second and third fingers are not changed. The small joints of the left hand are changed to less degree. The nails of the fingers are not changed. The ankle-joints and the joints of the feet are changed in a similar manner. The skin of the toes of the right foot is dry, covered by scales, toe ends glossy, the nails greatly thickened and furrowed. The toes and dorsum of the left foot are the seat of a moist, foul gangrene. Upon the inner surface of the right leg is an oval area of furrowed, horny thickening of the skin, raised 5 mm. above the general surface, 6 x 3 cm. in extent. Over the tuberosity of the right ischium is a deep, oval sore.

The skin shows also innumerable tumors, varying in size from a pinhead to a pecan-nut, quite movable and unattached to deeper structures, some barely raised above the surface, some almost pedunculated. Over some the skin is smoothly drawn, over others it is laxed and wrinkled ; they are either round and globular or oval and flattened ; in many places they show a disposition to arrange themselves in lines ; in the forehead and scalp they have a plexiform arrangement ; they are probably most numerous in the skin of the face and neck, the largest one being situated in the subcutaneous tissue of the right side of the neck ; they are also very numerous in the skin of the hands, especially the right ; over the trunk they occur quite richly, occurring in parallel lines along some of the ribs ; the skin of the legs contains the smallest number.

The peritoneal cavity is empty, its lining smooth and shining. The stomach is more vertical than usual, the lowest limit of the large curvature reaching below the umbilicus ; the cæcum and vermiform appendix lie in the true pelvis, pressing the uterus and ovaries against the lateral and anterior walls and the bladder ; the transverse colon describes a large curve, the convexity reaching to the lowermost part of the cavity. The diaphragm reaches to the fifth rib on both sides.

Both pleural cavities are empty, the pleuræ smooth. The right pleural cavity becomes very small in the lower part. Running along the lower edge of some of the ribs are extra-pleural rows of small nodules.

The phrenic nerve presents a few small cylindrical enlargements as it runs over the pericardium, which is empty and smooth.

There is no fat in the subserous tissue anywhere.

The tongue, pharynx and œsophagus are quite normal. The larynx and trachea are also normal. The thyroid is normal in size, the thymus absent.

The lungs crepitate ; they are rather light and spongy ; the cut surface is not much pigmented and is rather bloodless ; there is no bronchitis ; the peri-bronchial lymph-glands are not enlarged.

The pericardium is smooth ; in the subpericardial tissue of the ante-

rior surface of the left venricle, just below the auriculo-ventricular sulcus, lies a rounded mass, 1.5 x 7 cm., over which the epicardium is a

FIG. 1.
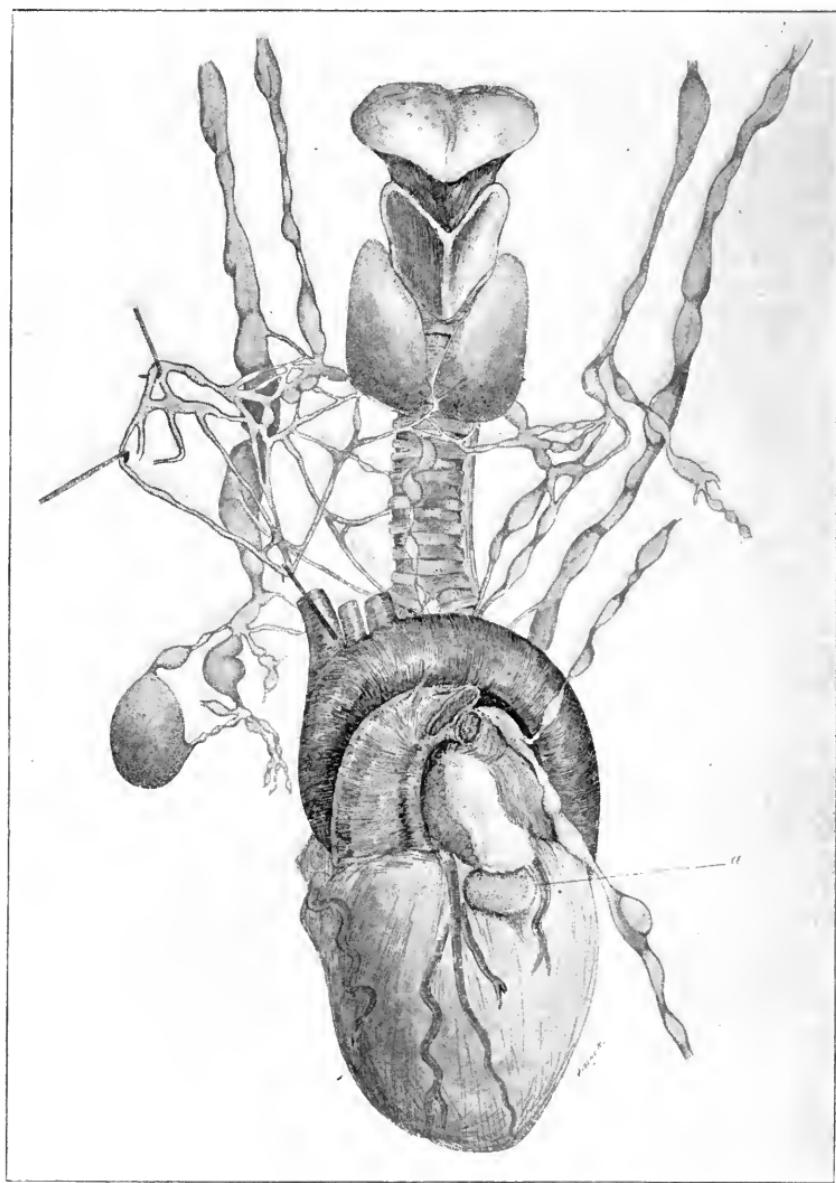
Showing tumors of pneumogastric and cervical sympathetic nerves and their branches. At *a* subpericardial tumor nodule.

little roughened (Fig. 1). The heart is small, the coronary vessels convoluted, the myocardium brownish, the endocardium smooth.

The spleen is of the usual size and free from changes.

The liver is small, has nutmeg cut surface. The gall-bladder is empty. In the mesentery appear many small, whitish, flattened, and oval, firm bodies, many of which are in the direct course of small nerves. In the part near the root are softer, yellowish masses as large as split pease or so. The mesenteric attachment of the duodenum contains several pairs of small bodies closely together, one of which is whitish and rather firm, the other more yellowish and rather soft. The serous covering of the duodenum has numerous slightly raised patches of irregular outlines and of a peculiar saffron color ; it is in general somewhat thicker and rougher than normal.

The stomach contains a quantity of blackish fluid ; in the fundus an extensive district of the mucosa has been digested, and a small part of the wall is so soft that it ruptures on handling ; otherwise the gastric mucosa is quite normal. The mucous membrane of the duodenum and jejunum contains a few irregular districts which are finely nodular to the feel, the membrane being somewhat granular to the eye. The ileum and the large intestine are quite normal, the latter containing masses of soft, yellow feces, the former being empty.

The nerves of the retroperitoneal tissue, including those radiating from the splanchnic ganglia, present closely aggregated beaded enlargements varying in size from a pinhead to a bean. The nerves in the pelvis behind the peritoneum present numerous globular and oval enlargements up to the size of walnuts, of a similar glistening and whitish appearance. Situated upon the inner surface of the left side of the upper half of the sacrum is a firm spherical mass as large as a pigeon's egg, which is deep bluish-black in color with a few gray spots, and which has a somewhat reticulated cut surface. The deep and superficial inguinal glands, especially on the right side, are pseudomelanotic and somewhat enlarged as well as quite firm.

The adrenals are normal in appearance, the right being rather flattened ; there are no tumors in their immediate vicinity. The kidneys are small, the capsules free, the surface slightly granular in places and rather yellowish. The cortical markings are somewhat indistinct. The pelves, ureters, and urinary bladder normal. The ovaries and uterus are small ; otherwise no changes.

The subcutaneous tissue of the scalp contains tangled, cord-like masses of thickened nerves both in the frontal and occipital regions ; in many the thickening seems diffused, in other cases small white tumors spring from the epineurium.

The skull is of moderate thickness but increased density. The skull form is symmetrical. The dura is smooth. The pia contains a moderate amount of clear fluid. Externally the brain and the intracranial portion of the cerebral nerves are normal. The brain is hardened unopened in formalin solution. The right optic nerve and the right globe and motor nerves show no changes. The hypophysis is of about normal size and the cella turcica is rather deep. The sphenoidal sinuses are empty and smooth. The frontal sinuses are covered with a layer of dirty, grayish, thick fluid.

On account of the spinal curvature it is rather troublesome to remove the spinal cord, which seems of natural size ; its membranes are smooth. Upon three or four of the lower dorsal nerves are small fusiform enlargements of the intraspinal portions. Upon each of the third and fourth right cervical nerves is a smooth, glistening, cylindrical enlarge-

ment, located within the spinal canal underneath the pia (Fig. 8); there are numerous similar enlargements in the course of the nerves outside of the canal; the larger of the intraspinal tumors is 3 by 1.5 cm., smooth and white, and presses the cord to one side; coursing over its surface are small, apparently healthy nerve bundles.

The spinal cord and brain are hardened as a whole in 4 per cent. formalin (see below).

In addition to the tumors in connection with the nerves already referred to, it is found that, generally speaking, every nerve of the neck, trunk, and lower extremities is the seat of numerous and variously sized globular or oval, firm growths. Thus both pneumogastrics and their connecting and other branches carry innumerable tumors that appear to spring from the peri- and endoneurium; the large trunks contain so many small tumors in their interior that they appear as if diffusely enlarged, the larger masses giving rise to nodules in the course of the nerve (Fig. 1). In the smaller branches the relation of the tumor to the sheath is often clearly shown, the nerve running over the tumor. One of the œsophageal branches presents a globular growth as large as a walnut, which presses upon the gullet and causes a narrowing of the lumen.

The sciatic nerves, which were hurriedly dissected out, together with the tibial nerves, present a similar well-marked diffuse nodular enlargement of the main trunks, which appear at least four times the normal size (Fig. 2); this great enlargement is likely due to the presence of tumors in the nerves, but here there also seems to be a diffuse overgrowth of the structures. The largest tumor of all is a cylindrical mass, 12 by 3.5 cm., situated loosely between the muscles on the anterior part of the right thigh and connected with a small intermuscular branch. The larger nerve trunks of the upper extremities are not dissected out, but feel markedly nodular on palpation.

The following joints were examined : The left wrist-joint, the metacarpo-phalangeal joints of the left hand, the right knee- and hip-joints. The right hip-joint is empty and the articular surfaces held in such close apposition by the thickening of the ligaments that partial ankylosis exists. The articular cartilages are thinned and somewhat roughened, but there is no distinct erosion and no marked osteophytic formations. The head of the femur is reduced in size. The knee-joint contains a small quantity of clear, viscid fluid, in which are small, grayish, turbid masses. The synovial fringes are changed into a soft, reddish, and granular tissue; surrounding the articular cartilages, which are thinned and roughened, are extensive erosions of the bone, in which lies a sort of granulation tissue that seems to be in direct connection with the red marrow that fills the medullary spaces; extensive resorption of the upper end of the tibia has taken place; the capsule and ligaments are thickened. Generally speaking, similar changes are present in joints of the hand and wrist (Fig. 3). The extensive resorption furrows around the articular bone ends are especially well marked; there is considerable clear viscid synovial fluid with gray flocculi, also soft masses of tissue on the synovial membranes, and thickenings of the capsules. There is probably some new bone at the margins of the grooves at the bone ends.

The marrow of the long bones is red.

Anatomical Diagnosis. Multiple fibromata of the cerebro-spinal and

FIG. 2.
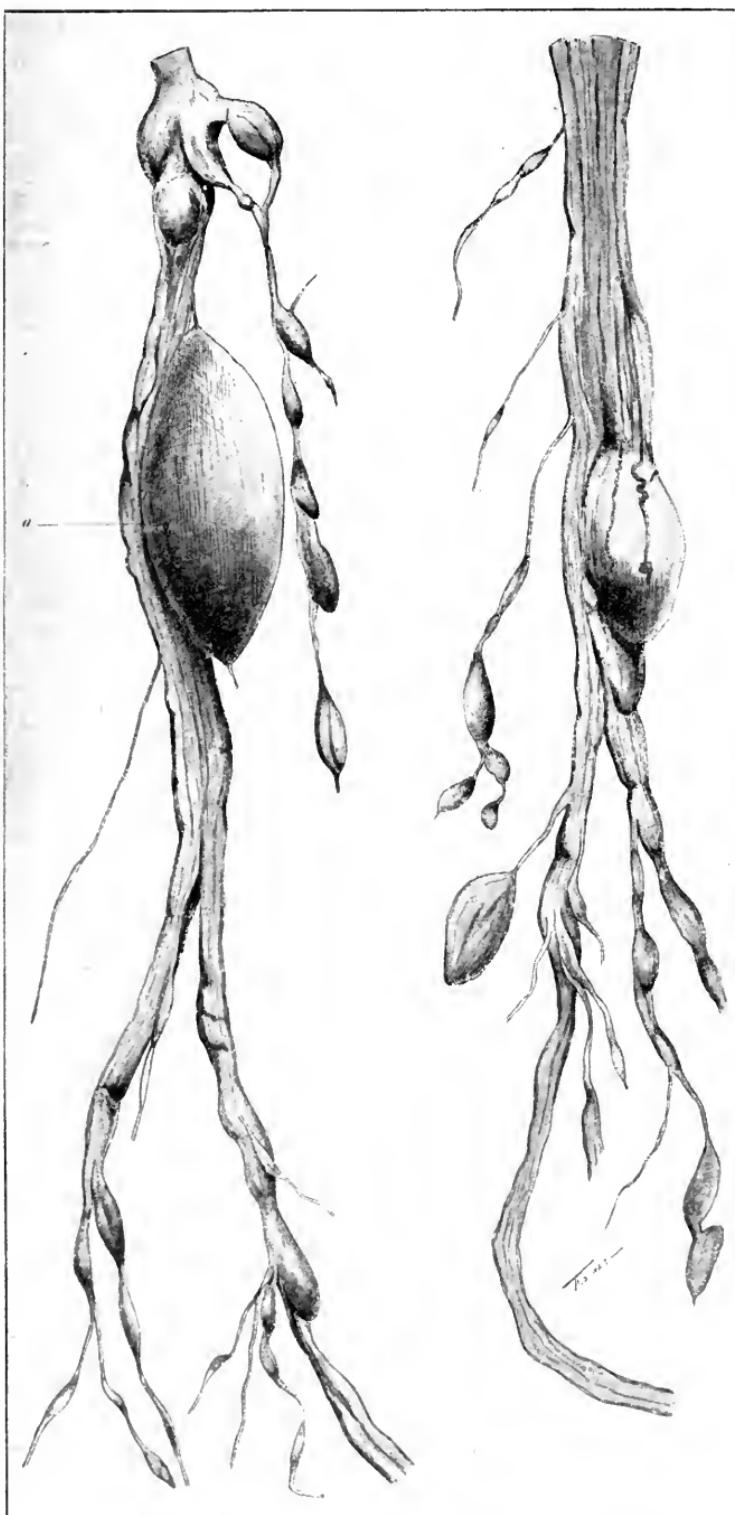
Tumors of sciatic nerves and their branches. At *a* large tumor connected with small

sympathetic nerves; compression of the spinal cord; polyarthritis deformans with kyphoskoliosis, ankyloses, and contractures; moist gangrene of left foot; decubitus; chronic dermatitis of left leg; inflammation of frontal sinus; chronic nephritis; marasmus.

BACTERIOLOGICAL EXAMINATION. Cultures made from the heart's blood, all the solid organs, and four sets of five tubes each of blood-serum inoculated with the contents of various joints; two tubes of human placental blood-serum inoculated with the same material.

Cover-slip preparations from the synovial fluids and from the synovial tissues stained in a great variety of ways do not show any micro-organisms, and all the cultures from the joints remain sterile.

A non-liquefying micrococcus, which takes Gram's stain and shows a marked tendency to arrange itself in fours, was isolated from the heart's blood and the spleen. The lungs contained the proteus vulgaris, the liver the colon bacillus; the kidneys were sterile.

HISTOLOGICAL EXAMINATION. The various tissues were fixed in 4 per cent. formalin, Zenker's fluid, Müller's fluid, and in alcohol. Some of the bones and joints of the fingers and of the metacarpus of the left hand were placed while fresh in a mixture containing 10 parts of nitric acid and 90 parts of formalin, some in concentrated aqueous solution of picric acid, and others were decalcified in 5 per cent. solution of nitric acid in alcohol after hardening. Preparations from specimens decalcified in the formalin and nitric acid mixture, which acts rapidly and safely, show the histological structure very well indeed.

Frozen sections of the lungs show some emphysema, the lumen of the bronchi is filled with round cells and inflammatory exudate, and there is some infiltration in the surrounding air cells. In the liver there is slight infiltration in Glisson's capsule. The adrenals seem quite normal. The ovaries are normal; also the spleen and the kidney. The heart muscle has a visible cement substance, and the amount of pigment in the cells is increased. The abdominal lymph glands are normal; the inguinal lymph glands are vascular and cellular, but there are no necrotic foci.

The lining of the right frontal sinus is the seat of a marked round-cell infiltration; the covering cells show considerable mucous degeneration, and in places marked desquamation has taken place.

The yellow, irregular thickening of the serous coat of the small intestine is shown in microscopic section from embedded pieces to depend in part upon small cellular accumulations in the serous and subserous tissue and in part upon hyaline thickenings in the same places. These changes have taken place largely at the expense of the external muscular fibres, those immediately underneath the small hyaline areas being atrophic and encircled by bands of hyaline material. In the cellular area the cells are endothelioid in appearance, having deeply stained nuclei and clear bodies; they are round or oval in outline. Small cell accumulations, as well as scattered cells of similar kind, also occur here and there between the muscular fibres, especially in the outer coat. In a few places the serous coat is strewn over by a fine yellowish-brown granular pigment without any other changes being present. In some places in the small intestine the submucosa is congested and œdematous, the vascular spaces being widely dilated and the connective-tissue fibres spread apart by a finely granular or homogeneous eosin-staining material which contains some scattered leucocytes. The mucous membrane

Fig. 3.

Skiagraph of left hand, showing absorption at articular ends and surface. (Courtesy of
Dr. Smith, X-ray Laboratory, Presbyterian Hospital.)

is partly absent; it is cellular, and contains in many places a fine, granular, brownish pigment. Sections stained for bacteria fail to show any. The distal end of the vermiform appendix is occluded, there being no mucous membrane present. In the proximal two-thirds the lumen is very small and filled with desquamated and mucoid cells; the muscular walls are much thickened, and in the subserous coat are small areas of more or less dense cell infiltration.

Paraffin sections of the thickened area in the skin of the leg show much increase in the depth of the corium, which is quite cellular, and forms a few broad, variously shaped but mostly rounded papillary projections, covered by a quite normal epithelium, which is of varying thickness and again covered by an abnormally thick layer of horny material.

Fig. 4.
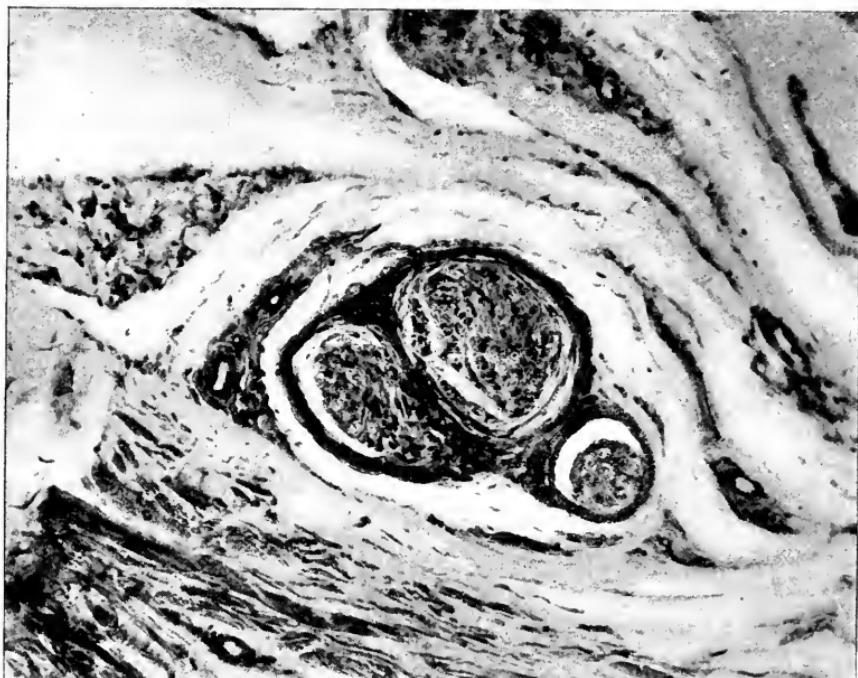
Chronic fibrous neuritis of small cutaneous nerve of left index finger. Hæmatoxylin and eosin. × 150.

The Sympathetic and Peripheral Nerves. The following description is based on the study of sections of embedded specimens stained with hæmatoxylin and eosin, Von Gieson's method, and Weigert's method for demonstrating the medullary sheaths.

The majority of the nodules observed in the mesentery are fibromata connected with nerves, and not lymph glands; frequently a small lymph node and a fibroma occur side by side; other fibromata occur upon nerves in close proximity to vessels. The fibrous tumors appear to spring from the nerve sheaths. They consist of a typical, fibrillated, more or less cellular and more or less dense connective tissue. In most

cases the fibrillar network is extremely tangled, but in some cases the fibres pursue quite parallel courses, bundles of parallel fibres crossing each other. The number of bloodvessels varies; in some places the tumors are quite vascular. The pigmented nodule in the pelvis appears to be an unusually vascular and cellular fibroma; in some places cells are especially numerous about small vessels; some quite large vessels have thin walls, and the tissue in which they occur is usually young. A few small recent hemorrhages are present; the nodule contains no ganglion cells.

Fig. 5.
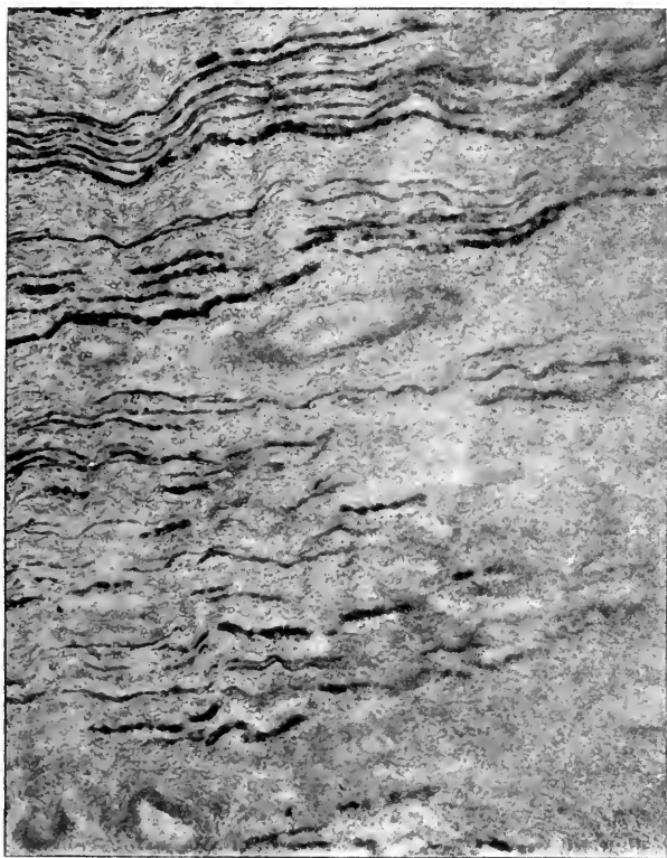
Degenerated nerves in fibroma of sciatic nerve. Weigert's stain. × 100.

Peripheral Nerves (Figs. 4, 5, 6). In some places the large fibrous mass in the thigh is somewhat œdematous. The sciatic nerve is the seat of large and small fibrous growths, circumscribed as well as quite diffuse, the fibrous tissue being distributed throughout nerve bundles, which then present the appearance of a marked proliferative interstitial neuritis. Many of the smaller nerve bundles with increased amount of connective tissue show an unusually large number of bloodvessels. Some of the arteries in the tissue between the nerve bundles show an almost complete obliteration of the lumen by intimal thickening. In

the smaller bundles appear small vessels, whose lumen is wholly filled with nucleated cells.

Sections from the skin show many smaller and larger subcutaneous fibromata. The perineurium of the nerves of the skin is quite generally thickened and cellular, and there is evident increase in the fibrous tissue in the interior of the nerves not the seat of circumscribed tumors (Fig. 4).

Longitudinal sections of the sciatic nerves, stained by Weigert's medullary sheath method, show many intact nerve bundles and also many scattered and single, more or less degenerated nerves coursing through the intraneural fibrous nodules (Fig. 5). In some of the diffusely thickened nerves there may be but a few healthy fibres; in others the fibres are quite numerous, partly healthy, partly degenerated, and spread apart by bands and areas of fibrous tissue.

FIG. 6.
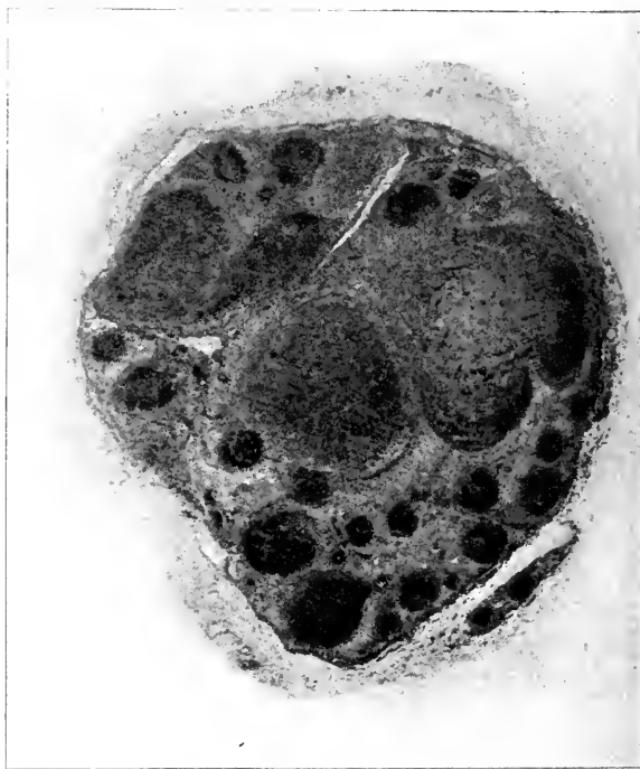
Cross section of anterior tibial nerve. Nerves in central fibromata. Weigert's stain. × 100.

Cross sections of the anterior tibial as well as of other nerves, stained in the same way, show also some healthy fibres in circumscribed, often central, tumor nodules, arranged around which are nerve bundles, in some of which are markedly degenerated districts (Fig. 6).

Many tumors give in the sections a quite decided reaction with Weigert's stain for elastic fibres, but accurate study of the distribution and amount of elastic tissue has not been made.

In none of the tumors were there any evidences of development of sarcoma.

Sections from the central part of the tumor corresponding to the fourth right cervical spinal ganglion show a diffuse fibromatous proliferation of the ganglion, the ganglion cells are pressed far apart by the fibrous tissue, and occur singly and in small groups (Figs. 7 and 8). The ganglion cells show more or less shrinking of the body, occasional vacuoles in the protoplasm, and apparently the capsules are rather more cellular than in some of the healthy ganglions examined. When the ganglion cells occur singly they generally have an oblong and narrow form, and lie parallel with the bundles or strands of fibrous tissue. A few ganglion cells have been reduced to shapeless remnants without nuclei.

FIG. 7.
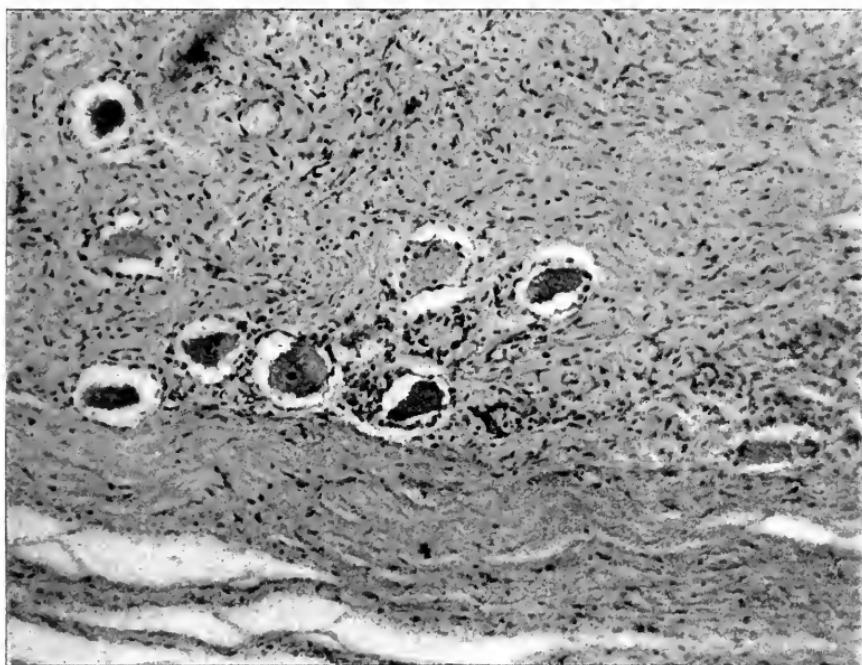
Section of spinal ganglion involved in fibroma. Hæmatoxylin and eosin. × 150.

The hardened brain, when cut into thin transverse and longitudinal slices, shows only normal appearances.

Examination of the formalin-hardened spinal cord shows that the gross changes due to the compression extend over a distance of $3\frac{1}{2}$ cm. where the cord is greatly flattened (Fig. 8). The cord is thinnest in the centre of this part, and here it measures 1 cm. in breadth and 2 to 3 mm. in thickness. It has a concavo-convex appearance, the margins of the compressed part being the thinnest. The pia-arachnoid cannot be readily loosened from the surface of the flattened portion, which seems firmer than the cord ordinarily is. At the greatest change the cut surface does not present any recognizable normal outline. As one approaches the limits of the compressed part, it can be readily

seen that the compression has been applied first upon the posterior-lateral aspect of the left half, resulting in the disturbance first of the right posterior horn and posterior columns, and these are the parts which lie immediately subjacent to the subdural fibromata (Fig. 10).

There are no cavities in the compressed part, and the central canal is not dilated.

The changes in the cord and medulla were studied by Mr. Martin H. Fischer, with the following result :

FIG. 8.
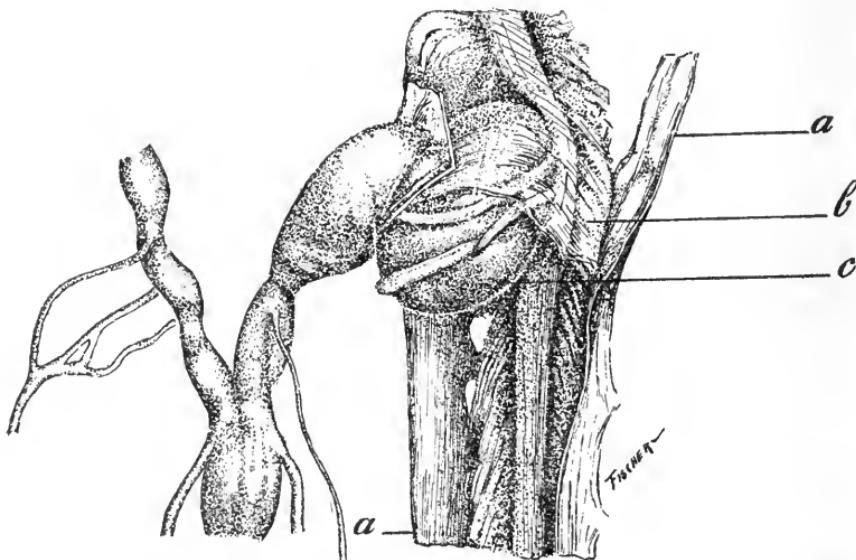
Compression of cord by intraspinal fibroma of fourth right cervical nerve. *a*, dura ; *b*, pia, with compressed cord underneath ; *c*, fibroma of the nerve. (Drawn from behind.)

Section through Middle of Medulla (Weigert's stain).

Distinct degenerative changes exist in the funiculus gracilis and the funiculus cuneatus. The restiform bodies show large numbers of degenerated fibres. The anterior pyramids show a general lightening. The evidences of degeneration are most marked in the central and peripheral portions of these tracts.

Section at Junction of Medulla and Spinal Cord.

The column of Goll is represented by a triangular lightened area lying close against the posterior median fissure. The apex rests against the gray commissure. At the periphery of this degenerated tract scarcely any nerve fibres can be found. The peripheral portion of the column of Burdach has suffered more severely, the most central part having suffered but little. The direct cerebellar, the lateral descending and ascending, and the direct pyramidal tracts show severe grades of degeneration. The process is most marked in the peripheral portions of the cord. The decussating fibres of the pyramids seen at this level are well stained in Weigert's preparations, though some degenerative changes can be seen.

The areas of degeneration are, in the main, symmetrical ; still, those of the left half of the cord are of a severer type than those of the right.

Section above the Tumor, Opposite the Fourth Cervical Vertebra (Fig. 9).

The entire left side of the cord has undergone a diminution in size. The columns of Goll and Burdach each show well-defined tracts of degeneration. The direct cerebellar, the crossed pyramidal, the antero-lateral ascending and descending, and the direct pyramidal tracts of the left side show scarcely any healthy nerve fibres. The crossed pyramidal tract of the same side shows a general lightening. On the right side a light rim of total degeneration marks the direct pyramidal and the antero-lateral ascending and descending cerebellar tracts. The entire anterior column of this side seems to have suffered a contraction. The tract of Lissauer shows a fairly well-marked degeneration on the left, but only a slight lightening on the right side.

The anterior and posterior horns of the left side show a diminution in size.

FIG. 9.
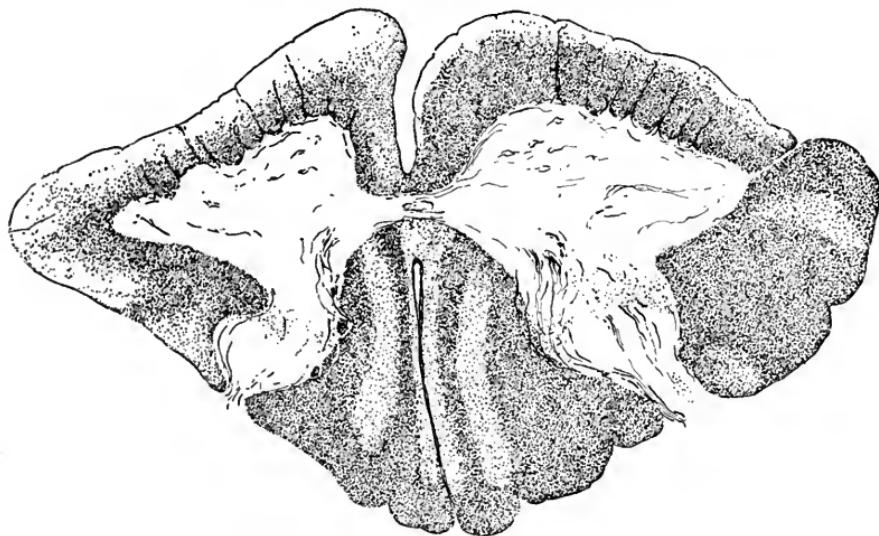
Section of cord above the tumor. For description of degenerated areas, see text.
Weigert's method.

Section Opposite the Tumor (Fig. 10).

A compression of the cord substance has occurred to the right and forward. The compression involves the left lateral and posterior and the right posterior columns. The posterior median fissure has been obliterated. A homogeneous unstained rim marks the position of the direct cerebellar, antero-lateral ascending and descending, and direct pyramidal tracts on the left side. The crossed pyramidal tract has suffered partial obliteration, and is perhaps represented by a lightened area of fibres at the posterior portion of the anterior horn. A marked degeneration is also noted in the direct pyramidal tract of the right side, with a questionable lightening of the crossed pyramidal tract. A narrow, well-defined area of degeneration is noted in the direct cerebellar

tract of this same side.   The two posterior columns have been fused
into one through the obliteration of the median fissure.   In the central
portion of this is seen an area of lightening, as also just internal to the
apex of the right posterior horn, which may correspond to the degen-

FIG. 10.
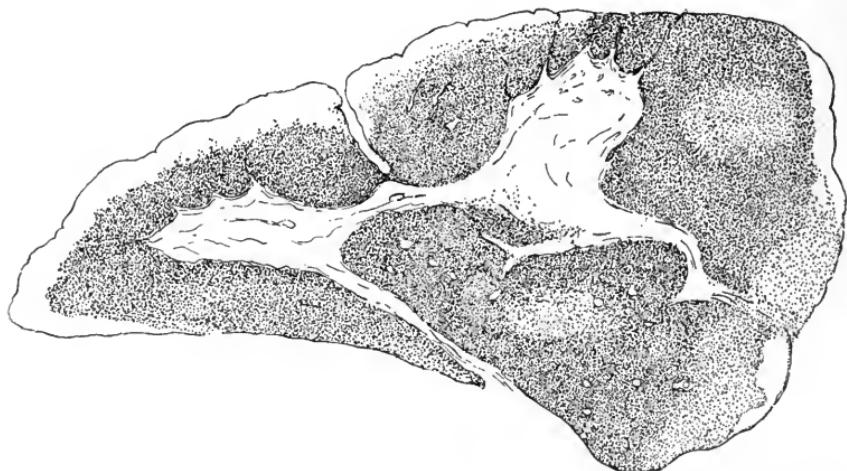
Section of cord opposite tumor. For detailed description, see text. The section shows
the deformity of the cord. Weigert's stain.

FIG. 11.
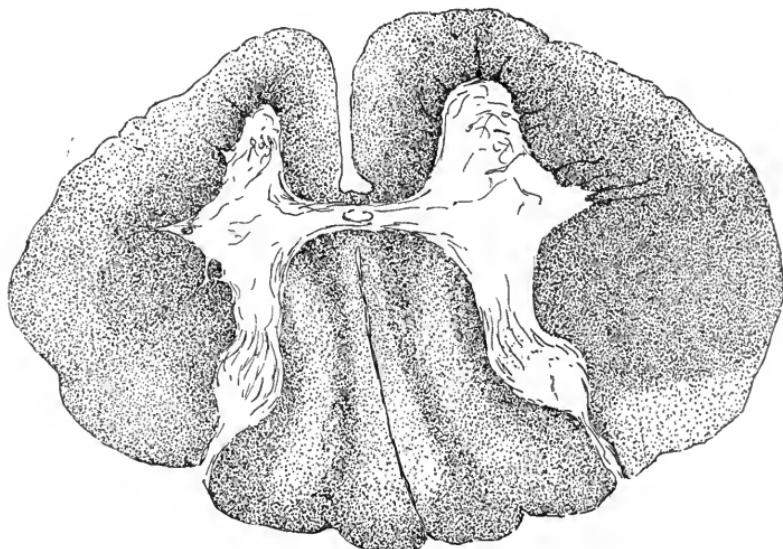
Section of cord opposite dorsal vertebra. For detailed description, see text.
Weigert's method.

erations observed above in the columns of Goll and Burdach.   The left
anterior horn is markedly increased in size.   It is flattened antero-
posteriorly, and the posterior horn proceeds from it backward and in-
ward as a narrow unstained band.

Section Below the Tumor, Opposite the Third Dorsal Vertebra (Fig. 11).

The columns of Goll and Burdach show a general lightening. A well-marked lightening has also occurred in the left lateral column of the cord, involving the crossed pyramidal, the direct cerebellar, and the antero-lateral ascending and descending tracts.   The crossed pyramidal tract is involved only in its external portion.   In the anterior columns the direct pyramidal tracts show marked lightening on both sides of the cord.   The antero-lateral ground substance on both sides shows no change.   A slight lightening has occurred in the antero-lateral ascending and descending tracts of the right side.   Just external to the apex of the posterior horns small areas of degeneration are seen which correspond to the tracts of Lissauer.   The anterior horn of the tumor side shows a diminution in size, having lost the rounded form possessed by the horn of the other side and assumed a more pyramidal shape.   The posterior horns are also thinner than on the right side.

Section from Mid-lumbar Region.

The areas of degeneration correspond in the main to those described in the sections from the mid-dorsal region.   A larger number of healthy fibres are found just around the gray matter in the antero-lateral ground bundle on both sides.   The degenerated tracts lie more at the periphery of the cord, and are rather indistinctly differentiated from each other.

The nerve fibres in the various localities show varying degrees of degeneration ; many of the fibres are shrunken ; others are much swollen, have lost their rounded form and become more or less oval and elliptical in shape.   As a rule, the areas which show the greatest number of small, contracted fibres show the greatest increase in connective tissue (Von Gieson's stain).

The myelin sheaths of the swollen fibres stain palely with Weigert's method.   The neuraxons are more or less eccentrically located ; in some localities the neuraxons have been entirely lost, and only drops of myelin are left to represent nerve fibres.

The rule that the localities which show the greatest number of small fibres show the largest amount of connective tissue increase is not an absolute one, as the anterior and lateral columns of the cord on the left side just opposite the tumor show a great number of swollen nerve fibres.   It would seem from this that as the tumor grew the increasing pressure upon the cord caused more and more fibres to degenerate, so that we have fibres in all portions of the cord in all stages of degeneration.

Marchi's method shows but few black-stained fibres ; these are seen most numerously in the peripheral regions below the seat of the compression, and more especially in the posterior portions of the cord. This reaction would go to indicate that while the majority of the nerve fibres represent old stages of degeneration demonstrable by Weigert's method, others are of more recent date, and so give the Marchi reaction.

Joints, Bones, Bone-marrow.   The marrow of the femur is quite congested and there is considerable focal cell accumulations.   Among the cells are recognized (hæmatoxylin and eosin) quite a number of richly granular eosinophiles, with small round nuclei, occasional megalocytes, and the ordinary narrow cells.

The joints of the left hand were the ones principally studied (Figs. 12, 13, and 14). The surfaces of the articular cartilages may be somewhat uneven, and just below it is a strip the matrix of which is a little fibrillated and split up, the cartilage cells being largely absent. The matrix of the principal part of the cartilage is quite normal, but there is usually more or less proliferation of the cartilage cells, leading at times to the accumulation of from four to eight or twelve cells in one capsule; the cartilaginous matrix is, moreover, rather granular and somewhat split up. In all cases the deeper layers of the cartilages are of a peculiar finely granular appearance and light bluish color (hæma-

Fig. 12.
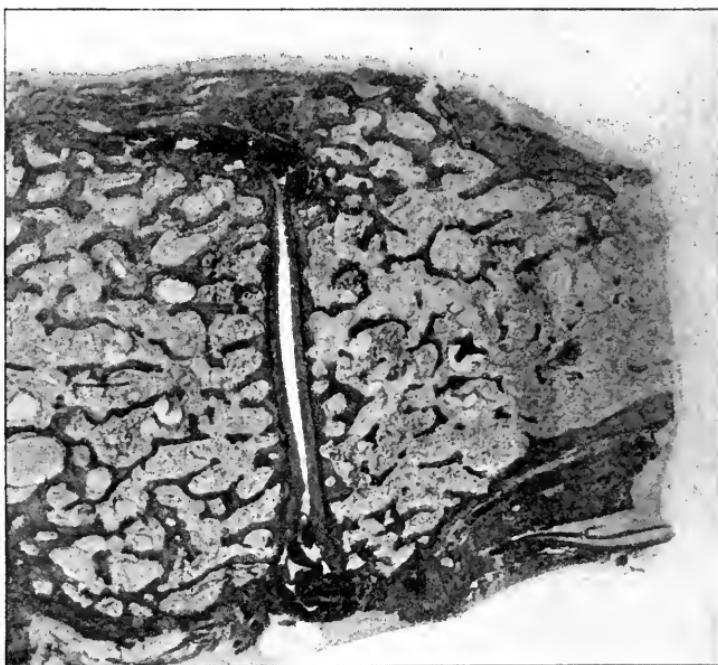
Section through a metacarpo-phalangeal joint of the left hand; shows the excavations at the margins of the articular cartilages filled with cellular connective tissue. The bone is porotic. Note the distinct junction between the cartilage and the bone. × 75.

toxylin); this zone is of a wavy outline (Figs. 12 and 13); at the margin of the more healthy cartilage there is a deeper blue color, as if a cloud of blue dust granules had been swept up to this point. The cartilage cells in this zone are largely absent or the nuclei fail to stain, so that the capsules appear empty; in some instances the capsular space contains a few small chromatin particles. This zone is sharply demarcated from the underlying bone. At the peripheral margins of the articular cartilages a vascular and cellular fibrous tissue more or less directly connected with the synovial fringes has replaced part of the cartilage and fills the excavation which has formed in the bone proper at these points, extending sometimes for some little distance into the subchondral medullary spaces as well as creeping along over the articu-

lar surface of the cartilage, which now presents an escalloped appearance (Figs. 12 and 13). Generally the line of junction between the cartilage and fibrous tissue is sharp and abrupt, but islands of connective tissue occasionally appear in the interior of the cartilage as if formed by metaplasia, the matrix of the cartilage becoming fibrillated and the cells liberated from the lacunæ, assuming the rôle of cells in fibrous tissue. The absorption of the bone has occurred principally at the margins of the articular cartilages, which often form overhanging shelvings over the fibrous tissue. There are no osteoclasts seen at the margins of the

Fig. 13.
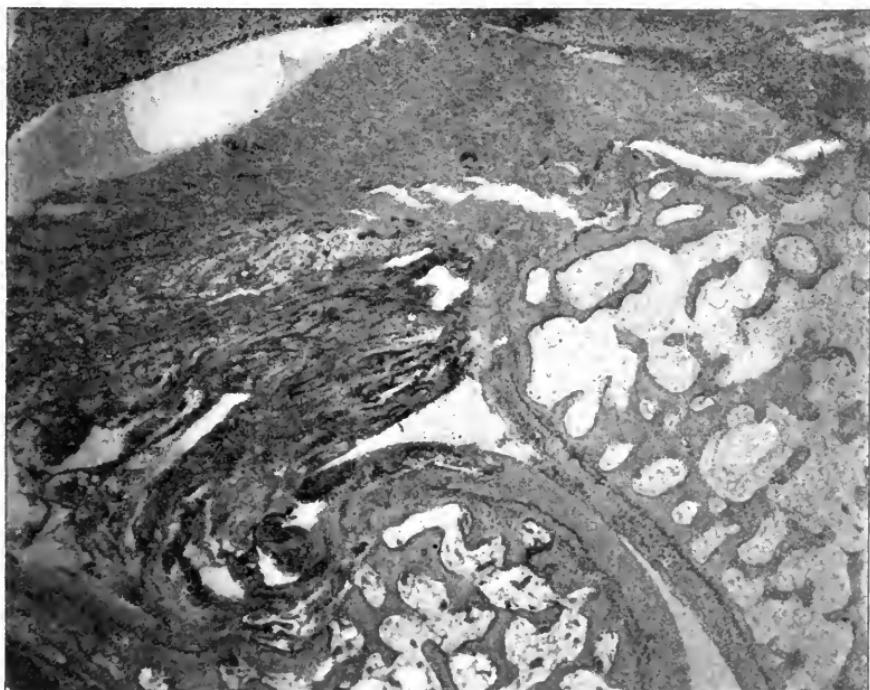
Part of Fig. 12, more highly magnified. Note replacement of cartilage at the margin by cellular connective tissue, which is creeping over the articular surface. See also wavy line at junction of bone and cartilage. × 200.

erosions in the bone. The medullary tissue is principally fatty ; occasionally small focal cell-accumulations occur. At times medullary tissue has formed in the deeper layers of the cartilages. The synovial membrane where it turns over the articular cartilage is the seat of delicate and branching villous outgrowths which contain very many rather large arteries and other vessels, the stroma between being richly infiltrated with small round and oval nuclei, the whole presenting an appearance not unlike an angioma (Fig. 14). At other times the cells are larger, younger, and the vessels provided with thinner walls, so that the tissue looks like a recent granulation tissue. At some distance away from the joints there is more or less well-marked periosteal proliferation in the form of osteoid tissue.[1]

[1] These interesting changes in the bones and joints are reserved for a more complete consideration in the future.

Fig. 14.
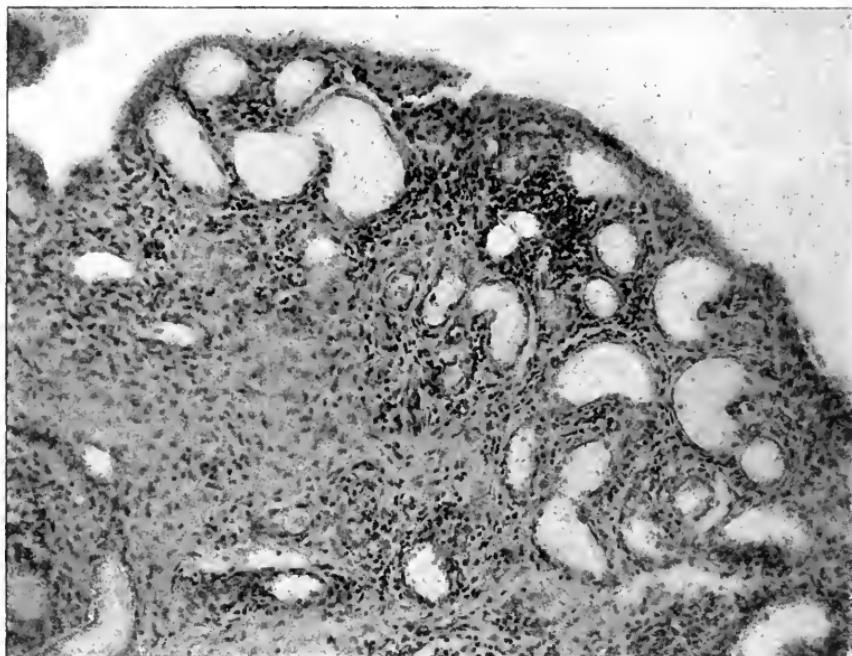
Section of villous outgrowth of synovial membrane, showing the cellular and vascular structure. × 200.

GENERAL CONSIDERATIONS (Dr. Preble). The case is an extreme degree of a very common condition, that of generalized neurofibromatosis, but has more than ordinary interest because it presents certain features which are rare, if not unique —the joint changes and the trophic changes in the skin.

Cases of fibrous tumors growing from the fibrous portions of the peripheral nerves have been recorded in medical literature since 1793, when Tilesius (quoted by Modrzejewski) reported the first case. No correct appreciation of their true nature, however, was suggested until 1847, when Brüch suggested that these tumors were due to polypoid growth of the neurilemma. Rokitansky shared this opinion. In 1880, Prudden collected forty-one examples of this condition. In 1882, Recklinghausen, by careful study of cases, showed that the fibroid tumors of the skin, the fibroma molluscum of Virchow, arose from the fibrous portions of the peripheral nerves. Since then these cases have attracted much interest and study, so that to-day there is a vast literature and a great number of cases recorded. When to the cases frankly of this nature we add the cases of conditions probably exactly similar, so far as their pathology and pathogenesis are concerned, though different in their clinical manifestations, the number becomes very large

indeed. We should include many cases of elephantiasis and many cases of pigmented and linear nævi. The number could be easily still further increased, for lesser degrees of this condition of neurofibromatosis are so common that one could readily collect hundreds of examples in a few weeks.

Etiology. A very large number of the cases are congenital, but one cannot agree with Bruns, who says they are always congenital. There are many examples in which the first tumor has appeared some years after birth, as is illustrated by the case recorded above and by those of Generisch, in which the tumor appeared at eight, Lahman at twenty-three, Berggrün at ten, Hitchcock at nineteen, and many others.

In some cases, while no tumors are present at birth, there are congenital pigment flecks, and later the tumors appear. The case of Feindel and Oppenheim is an example of this, as is also the case of Spillmann and Etienne.

Not only are many of the tumors congenital, but in many cases they are found in other members of the same family : Herczel, mother and grandmother ; Virchow, grandfather, father, and brother ; Hecker, grandmother and parent ; Czerny, grandfather, greatuncle, uncle, and mother ; Bruns, two brothers ; Hitchcock, mother and two sisters. Many other examples might be quoted, but no instance of extension through more than three generations has been found.

Some authors (Landowski and Feindel) believe, when the tumors appear late in life, that some exciting cause, such as bad hygienic surroundings, overwork, cold, trauma, or infection has been at work upon one who has a congenital predisposition to these tumors, and the tumors have resulted. The first case of Spillmann and Etienne may be an example of this. This patient, a male adult, had had pigment spots on the skin for many years, when, after a fall which stretched the sciatic nerve, tumors appeared scattered over the skin. Most authors believe, with Feindel, that there is during the development of the embryo some disturbance of the tissues derived from the ectoderm. If the disturbance is marked the effects in the way of skin tumors, tumors of the nerves and pigmented areas appear at birth. If the disturbance is less there is no sign at birth, and only later, under the influence of some incidental cause, do the results appear.

Recklinghausen, Etienne and others have suggested that the linear nævi which show such manifest relations to the peripheral nerve are due to an intra-uterine neuritis or myelitis, which so lessens the control of the nutrition of the skin that certain elements hypertrophy. Such fœtal neuritis might be due to some infection or intoxication from the mother. These linear nævi are seen frequently with skin and nerve fibromata, and it seems likely that they are due to the same underlying processes.

Other authors, notably Esmarch and Kulenkampf, suggest that there

is a fibroid diathesis which is the cause of the neurofibromatosis; others suggest that it may be an intoxication, like Addison's disease or myxœdema. Still others suggest a specific infection, which, like lepra, causes pigmentation of the skin, and tumors of the nerves and skin.

Symptomatology. Following the example of Landowski, Feindel and Oppenheim, Briquet and others, we can conveniently divide the symptoms into four groups: tumors of the skin, tumors of the nerves, pigmentation of the skin, and functional disturbances. A completely developed case shows symptoms from all four groups; but there is a much larger number of cases which are incomplete, showing symptoms from three, two, or even one group only. The case reported above showed no areas of pigmentation, but symptoms from each of the other groups were present. The two groups most frequently absent from the clinical picture of these cases reported are the pigmentations and functional disturbances. I am inclined, however, to believe that mention of the pigmentation is frequently omitted from the history sheets because of the apparent insignificance. If one takes into consideration the very numerous, incompletely developed cases seen almost daily in the clinic, one must conclude that the two symptoms commonly present are skin tumors and pigmentation, while the tumors of the nerves, and especially functional disturbances, are the exceptions.

Skin Tumors. The number of tumors varies from one or two to many thousands. In the case reported above there were many hundreds of tumors in the skin, scattered irregularly over the body. Modrzejewski reports one case with 3000 tumors. Virchow, in his book on tumors, has a picture of a patient who must have had thousands of these tumors. Lesser, in his text-book upon diseases of the skin, figures a patient who presents many hundreds of the ordinary forms of the fibroma of the skin and nerves, and also the larger form, the molluscum fibrosum, *Rankenneurom*, or elephantiasis neuromatodes.

The tumors vary in size from a pinhead to a large egg. They may be sessile or pedunculated, tending to become the latter as they increase in size. The skin covering them may be perfectly normal, but with many of the tumors the skin is thin, relaxed, and thrown into fine, irregular folds, looking as if it had been stretched for some time and then relaxed. Ordinarily the skin covering these tumors contains less than the normal amount of pigment, but it may be pigmented. Sometimes the skin grows large comedones; but these cases, as will be shown later, are probably not neurofibromata. The tumors are usually soft, but may be hard and dense. They are usually neither tender nor painful. They cause no disturbance except mechanically from their site or size.

In addition to these tumors, which are the common form, there are others of exactly the same nature, described under various names:

fibroma molluscum, *Rankenneurom*, and elephantiasis neuromatodes. The resulting tumors are often very large, and may take the shape of fairly circumscribed tumors or of irregular thick folds, and laps of skin, such as are seen in the other forms of elephantiasis. The skin covering these folds may be unaltered until the mass becomes very large, when it tends to become inflamed. The skin is much more frequently pigmented than with the ordinary fibromata, and in some cases may be covered by a growth of hair. The *Rankenneurom* is often seen in combination with the ordinary tumors, as is illustrated by the cases shown by Lesser, Herczel, Czerny, Kriege, Bruns and others, but may occur without them, but with pigmentation, as reported by Bruns; or we may find skin tumors, nerve tumors, and *Rankenneurom* combined in the same patient, as reported by Kriege.

These large tumors cause no disturbance except such as results mechanically, and cannot be distinguished clinically from other forms of elephantiasis except by the presence of the commoner manifestation of generalized neurofibromatosis.

Nerve Tumors. These may occur alone—*i. e.*, without skin tumors—as is illustrated by the cases of Lahman, Kriege, Keen, Spiller and others; but, as a rule, when multiple nerves are involved there are tumors of the skin also. Picque collected fifty cases of plexiform neuromas, in eighteen of which it is stated that there were cutaneous neurofibromata. The relative importance of the nerve and skin tumors varies in the individual cases. For example, in the case above, the tumors of the nerves are much more numerous and important. This is also true in the very extreme case reported by Berggrün.

The tumors vary in size from those which are too small to be palpated to the size of the large tumor in the right thigh—12 by 3.5 centimetres, or even larger. The tumors are round, oval, or fusiform, not attached to the surrounding parts, so that motion from side to side is permitted, but longitudinal motion in either direction is prevented by the want of elasticity of the nerve. Usually there is more than one tumor on a nerve, thus presenting an arrangement like a string of beads. The tumors may develop along the trunk of a nerve or along its branches. When the latter is true irregular convoluted masses result, which feel not unlike a varicocele, except for their density. The tumors, as a rule, are firm, but in some cases they are cystic. They are usually neither tender nor painful, but may be. The patient reported above had one tumor in the left side of the neck, which was tender and painful, although post-mortem it differed in no way from the other tumors found.

The tumors may affect a few nerves, or many, and there is no nerve in the body which may not be affected. The spinal, cranial, and sympathetic nerves are all found involved in many cases. As a rule, the involvement of the spinal and cranial nerves does not extend into the

cranial cavity, but there are numerous exceptions. For example, the case of Generisch and Berggrün, in which both cranial and spinal nerves were enlarged into the cranial and spinal cavities, and in the case of Czerny and the one above in which the enlargement of the spinal nerves extended within the dura, but the cranial nerves within the cavity escaped.

Pigmentation occurs in a variety of forms, colors, and arrangements. In many cases the only portions of the skin which are pigmented are those covering the tumors. In others the pigment occurs as flat or but slightly elevated areas, varying in size from a pinhead to a large plaque. The pigment flecks are usually most numerous over the covered part, the trunks, the thighs, and arms, while the face, arms, and legs usually escape. Generally there is no sign of an arrangement of the pigmented areas, but in the case reported by Dupin and Dieulafe many of the pigmented areas were elliptical in shape, with a tendency for the long axis of the ellipse to lie parallel to the long axis of the limb. Feindel and Oppenheim note in their second case that some of the pigmented areas follow the course of the nerves.

The color of these areas varies from light brown, café au lait, to dark brown. Usually there are no hairs in the pigment flecks, but in some cases, as in those of Marie and Bernard, Delore and Bonne, they are found. Briquet includes hairy and vascular nævi in his list of symptoms of this condition. In a case reported by Depaul and Verneuil, a tumor of the neck near the scalp was covered by thick, coarse hair, which differed from that covering the scalp. Below this tumor were, under thick, brownish skin, corresponding exactly to the distribution of the cervical plexus, nodular strings like a varicocele.

Functional Disturbances. One might expect that the tumors of the nerve would cause marked disturbances in their functions ; but, as a matter of fact, even slight disturbances are rare. The commonest symptom in this group is pain, which may be spontaneous or appear on pressure. The pain may be in the tumor, or radiate to the area supplied by the nerve affected. Actual disturbances of function are less common, and may be sensory or motor, and be either of the nature of excitation or paralysis. Paræsthesia, hyperæsthesia, anæsthesia, cramps, tonic convulsions, weakness, and paralysis are all seen. A small number of cases suffer from arthralgia. In a few cases symptoms from involvement of the vagus have been seen : dysphagia, hoarseness, dyspnœa, palpitation, and tachycardia (Generisch).

Briquet saw vomiting and cramps in the abdomen in one case.

The case reported by Berggrün shows more marked disturbances than any case recorded, but in his case the enlargements on the cranial nerves extended to the cranial cavity, and many of the symptoms, such as paralysis of various of the motor nerves of the eyes and the optic

neuritis were due to the intracranial tumors rather than to the fibromatosis of the nerves. Those few cases in which there has been paralysis of the bladder and rectum, atrophy of certain muscles, were probably cases in which the cord was compressed by tumors in the spinal canal. Extension into the spinal canal does not always cause symptoms, even when there is considerable pressure of the cord, as is illustrated by the cases of Generisch and Czerny and the case above.

Many of the patients are of a low order of intelligence, apathetic, languid, and stupid ; but this is scarcely the rule, as some of the French authors consider it to be.

No descriptions of trophic disturbances have been found in any of the reports ; there is, indeed, no mention made of them except by Landowski, who says they are very rare, and von Büngner, who says they are usually absent.

The patient J. S. had for some years on the posterior aspect of one thigh an ulcer which looked in all ways like the perforating ulcers so often seen on the feet of tabetic patients, and resisted treatment in the same way. This was looked upon clinically as a perforating ulcer of trophic origin. The gangrene of one foot coming on spontaneously was regarded as of the same nature.

The joint changes in this patient might also be regarded as due to nerve influence. Their painless course and the great resultant deformity, together with the symmetry of the involvement in a patient whose peripheral nerves were so greatly altered, naturally suggested this idea. The distribution, deformity, and involvement of the spine were such as are seen in well-marked cases of arthritis deformans. In reviewing the literature no mention of joint changes was found except in the report by Berggrün and that by Dupin and Dieulafe. In Berggrün's case both hips and knees were strongly flexed, but could be moved passively, although the amount of motion in the hips was slight. The ends of the right femur and tibia were markedly thickened. At the autopsy the head of the left femur was out of the socket, the teres ligament was relaxed, the joint cavity was small and filled with loose, red tissue, and the head of the femur was flattened. Dupin's and Dieulafe's case suffered from rhachitis and repeated attacks of acute articular rheumatism when young, and the bone and joint changes may easily be the results of the early illnesses. The lower epiphyses of the forearm are enlarged, the first phalanges are flexed on the metacarpal bones, the third phalanges are extended, the phalanges are subluxated because of the relaxation of the ligaments, and dorsal scoliosis and double genu valgum are the changes noted. These are the only recorded cases of joint changes in the course of neurofibromatosis, and inasmuch as the disease in its milder forms is very common, and not very rare, even in its severe forms, I believe, we must give up the very fascinating idea

that there is some intimate relation between the two conditions and regard the combination as merely accidental.

The course of the disease is slowly progressive, and only in the severest cases causes trouble and danger. Rarely we find exceptions to this slow course, as is illustrated by the patient of Berggrün, who died at the age of eleven, directly from the effects of the neurofibromatosis. Many of the patients die from some intercurrent disease; others develop a gradually increasing anæmia and cachexia, and die from exhaustion; still others die from the effects of the accidental location of some tumor; while some die from sarcomatous degeneration of the fibrous tumor. This last is by no means infrequent, so that numerous cases have been recorded. Garré collects seventeen cases of sarcomatous degeneration. The cause of this change in the nature of the tumor is unknown, but in some cases it seems to have been some trauma.

The *prognosis* in the milder cases is good, but in the severer forms must be conservative because of the danger of a tumor developing at some spot where it can mechanically cause serious disturbances, and because a tumor may at any moment become malignant.

Diagnosis. This is usually easy because of the marked and peculiar nature of the symptoms. Lahman has drawn attention to the fact that multiple fibromata of the skin may arise from the fibrous tissue of other parts of the skin than the nerves, and proposes dividing these fibromata into four classes according as they arise from the fibrous tissue of the nerves, the vessels, the glands, or from several of these. The differentiation of these may require microscopical examination unless there are deeper tumors having the character, location, and arrangement of tumors of the nerves.

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THE RELATION OF CHOLELITHIASIS TO DISEASE OF THE PANCREAS AND TO FAT NECROSIS.

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Since the common bile-duct and the main duct of the pancreas unite in the diverticulum of Vater before reaching the lumen of the duodenum, changes occurring in one may produce pathological conditions in the other and consequent lesions of the liver or pancreas. The object of the present paper is to direct attention to the occurrence of pancreatic disease as a complication of gallstone colic, to the method of its occurrence, and to the nature of the lesions which ensue.

The association of the two conditions has been incidentally mentioned by a number of writers. In the several recently published monographs on diseases of the pancreas reference to it is made. Kôrte,[1] writing on the surgery of the pancreas, notes that diseases of the bile passages, especially cholelithiasis, are frequently associated with lesions of the pancreas, and thinks it is probable that inflammation can extend from the bile-duct to the gland. Oser[2] thinks that catarrhal inflammation may extend from the gall passages to the pancreatic duct, producing obstruction of the secretion and its consequences; the pancreatic duct may be occluded by a stone lodged in the common duct near its orifice. Lancereaux[3] mentions the possibility that a gallstone lodged in the common duct at the level of the diverticulum of Vater may occlude the pancreatic duct and produce conditions favorable to the penetration of micro-organisms into the pancreas. Ebstein[4] has recently reported a case of diabetes associated with attacks of abdominal pain. Seeking an explanation of the obscure symptoms, he discusses the interrelation of pancreatic and hepatic disease. He recalls the fact that the ductus communis choledochus and the duct of Wirsung enter the intestine side by side, so that a gallstone or a pancreatic calculus lodged near the orifice of either duct might occlude both.

Gallstones are not infrequently accompanied by inflammatory changes in various parts of the bile passages, and it is conceivable that secondary lesions of the pancreas may follow. The inflammatory process whose immediate cause is the presence and development of micro-organisms may extend along the common duct, to the diverticulum of Vater, be transmitted to the main pancreatic duct, and thence to the parenchyma of the organ. Biliary calculi may favor the occurrence of pancreatic lesions by another method. Lodged near the orifice of the common duct they may compress the neighboring duct of Wirsung and obstruct the outflow of the pancreatic juice. When the duct is wholly or partially occluded one may readily believe that, though the secretion of the gland cannot enter the intestine, micro-organisms may make their way from the duodenum into the dammed-back secretion, and, multiplying, produce inflammatory changes in the gland. The obstructed secretion, moreover, may be forced backward into the gland parenchyma, and, even though micro-organisms have not entered, may produce injurious effects upon the substance of the organ.

When the common bile-duct is occluded the secretion of the liver forced back upon the organ finds its way into the interstitial tissue, whence it is transmitted to more distant parts by way of the lymphatics

[1] Chirurg. Krankh. des Pankreas.   Deutsche Chirurgie, Stuttgart, 1898.

[2] Die Erkrank. des Pankreas.   Nothnagel's Spec. Path. u. Ther., Vienna, 1898, vol. xvii.

[3] Traite des malades des foie et des pancréas, Paris, 1899.

[4] Zeitsch. f. klin. Med., 1900, vol. xl. p. 181.

and reaches the blood through the thoracic duct.   The bile-pigments stain the tissues a conspicuous yellow color and indicate the presence of retained products of secretion.   The pancreatic juice, on the contrary, containing no pigment, does not carry an index of its presence. When the pancreatic duct is occluded, do we find any evidence that the secretion has penetrated the surrounding tissue and there produced deleterious effects ?

Disseminated fat necrosis was first accurately described by Balser in 1882.   Not infrequently one finds studding the fat in the immediate neighborhood of the pancreas opaque, white areas, varying in size. Less frequently similar opaque foci are found in the omentum, mesentery, and subperitoneal fat of the abdominal walls ; rarely in the pericardial and subcutaneous fat.   Microscopical examination shows that the fat cells in these areas are necrotic, and the micro-chemical studies of Langenhans[1] have demonstrated that the necrosis is associated with the splitting of the contained fat into its fatty acid and glycerin.   The former, being insoluble, remains in the cell, and subsequently unites with calcium salts, while the soluble glycerin is absorbed and carried away. Various lesions of the pancreas have been found associated with fat necrosis, notably hemorrhagic and gangrenous pancreatitis, more rarely other changes.   The investigations of Langenhans, Hildebrand and Dettmer, Milisch, Williams, Flexner, Katz and Winkler, and Opie have shown that the active factor in the production of necrosis of the fat cell and disintegration of the fat is the fat-splitting ferment of the pancreatic juice, which as the result of some lesion of the gland has made its way into the surrounding tissue and come in contact with the fat cells.

In a series of experiments recently reported[2] I have shown that ligation of both pancreatic ducts in the cat causes very wide-spread fat necrosis, involving almost the entire abdominal fat, at times the subcutaneous and pericardial fat, and reproduces the wide distribution occasionally observed in human beings and in animals.   If the ducts are ligated and pilocarpin is subsequently administered to the animal in order to stimulate the secretion of the pancreas, the dissemination of the pancreatic secretion is much hastened and very wide-spread focal fat necrosis rapidly occurs.   The experiments show that when the outflow of the pancreatic juice is obstructed the products of secretion, dammed back upon the gland, penetrate into the tissue surrounding it and produce alterations which serve as an indication of their presence.   The pancreatic lesions which in human cases are associated with necrosis of fat are such as permit the penetration of the secretion into the tissue.

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[1] Virchow's Arch., 1890, vol. cxxii. p. 252.

[2] Contributions to the Science of Medicine.   Dedicated to Wm. H. Welch, M. ., Baltimore, 1900, p. 859.

Fat necrosis may be regarded as an index of pancreatic disease, and is, therefore, an important factor in the study of lesions affecting the organ. The condition is a consequence of pancreatic lesions much as jaundice is a symptom of hepatic disease, and is not, therefore, an independent morbid entity.

In recording the experiments referred to above I have taken occasion to point out that obstruction of the pancreatic duct in human cases is not infrequently associated with disseminated fat necrosis. The condition occasionally follows occlusion of the duct by calculi or by carcinoma. Several cases are cited where gallstones were found lodged in the common bile-duct near its orifice in such a position that they might at the same time occlude the pancreatic duct.

The anatomical relations of the common bile-duct and the duct of Wirsung are well known. The common bile-duct descends toward the duodenum alongside the head of the pancreas, occasionally embedded in its substance, and comes in contact with the duct of Wirsung, beside which it lies for a short but variable distance before entering the wall of the intestine. The two ducts penetrate side by side the coats of the duodenum, and after passing obliquely a distance of about 2 cm. and causing a papilla-like elevation of the mucous membrane, unite to form a short cavity—the diverticulum of Vater. Near its termination, at a point where the two ducts are in contact, the common duct becomes constricted, and it is here that a foreign body passing downward tends to lodge.

Of considerable importance is the fact that occlusion of the main pancreatic duct does not necessarily cause complete obstruction to the outflow of the pancreatic secretion. The duct of Wirsung communicates within the gland with the accessory pancreatic duct or duct of Santorini, which opens into the duodenum at a point 2.5 to 3.5 cm. nearer the stomach. Schirmer[1] has studied the relation of the two ducts in a large number of human cases, and has found that it presents much variation. Among 104 bodies he found that in sixty-five instances the accessory pancreatic duct anastomosed with the larger within the organ and opened by a separate orifice into the duodenum. In one instance three ducts entered the duodenum. In four cases the common bile-duct alone opened into the diverticulum of Vater, while the single pancreatic duct entered the duodenum at a point corresponding to the usual site of the orifice of the accessory duct. In thirty-four instances the smaller duct did not anastomose with the larger or communicate with the duodenum. In the latter case alone would it be possible for a stone lodged in the diverticulum of Vater or in the common duct, where it comes in contact with the pancreatic duct, to obstruct completely the outflow of the

pancreatic secretion. In only slightly more than one-third of the cases where gallstones lodge near the orifice of the common duct should one expect to find changes in the pancreas referable to duct obstruction.

Opportunity has recently been afforded for the study of a case in which lesions of the pancreas were associated with the impaction of a stone near the orifice of the common duct. In view of the obscurity in which the etiology of pancreatic lesions is still involved, it may be of interest to record the case and to compare it with others in which a similar etiological factor is more or less clearly demonstrable.

L. F., male, aged forty-seven years. The patient was admitted to the Johns Hopkins Hospital, service of Dr. Osler, complaining of abdominal pain and fever. His family history is unimportant. With the exception of rather frequent attacks of indigestion, characterized by pain after eating, distention, and rarely nausea and vomiting, he has enjoyed good health. He does not use alcohol in any form. Six months before his present illness he suffered from an attack of jaundice, lasting about three weeks, and accompanied by abdominal pain and some fever. His stools at this time were somewhat clay-colored. At the end of three weeks he felt perfectly well.

The present illness began eighteen days before admission to the hospital, when about 9 p.m. the patient was suddenly seized with violent nausea and vomiting, accompanied by intense cramp-like pain in the abdomen. The vomiting continued during the first night, and has since only occasionally recurred. The abdominal pain, which was not localized, remained severe during four or five days, and at times there were symptoms of collapse. The abdomen was distended and the bowels were constipated until the fifth day, when, with the aid of a purgative, movement occurred. The stool was normal in color. On the third day elevation of temperature to 101.5° F. was noted. About the seventh day tenderness and slight swelling were noticed in the right hypochondriac region. Since this time the patient has had an irregular temperature (100° to 103° F.), with several chills ; the pulse, 100 to 120 a minute, has been at times dicrotic. Since the first few days the abdominal pain and tenderness have not been severe, but distention of the abdomen has gradually increased. Jaundice has not been noted

Physical Examination (note by Dr. Futcher). The patient is a large-framed man. The complexion is somewhat sallow and the conjunctivæ have a slightly yellow cast. The pulse is of fairly good volume, regular in force and rhythm. Examination of the heart and lungs is negative. On inspection of the abdomen the right costal groove is found to be partly obliterated. A distinct prominence occupies the right hypochondriac and right half of the epigastric region and extends into the upper half of the umbilical region. Its lower margin, which descends on inspiration, is felt in the median line at the level of the umbilicus ; in the mammary line, 10.5 cm. below the costal margin. Its right border cannot be sharply defined. In the median line the fingers can be pressed in above it. Over the resistant mass there is dull tympany, continuous with the hepatic flatness. Leucocytes, 18,300. Urine, clear ; specific gravity, 1017 ; acid. There is no reduction of Fehling's solution. A trace of albumin is present.

On the second day after admission a stool passed was of golden-yellow color. On the third day the leucocytes numbered 19,500, and the temperature varied from 99.2° to 101.8° F. During the night the patient was irrational at times. The temperature rose gradually, reaching a maximum of 104° F. A liquid stool of ochre-yellow color was passed. Urine: specific gravity, 1020; no reaction for sugar was obtained.

The diagnosis of suppurative pancreatitis was made by Dr. Bloodgood, and an operation for its relief was performed under cocaine anæsthesia. A linear longitudinal incision was made below the costal margin within the right mammillary line. After incising the great omentum between the stomach and transverse colon an abscess cavity was entered. Grumous, purulent fluid containing necrotic particles was evacuated. A rubber drainage-tube, packed about with gauze, was inserted into the wound. After operation the pulse remained weak, and death followed at the end of about four hours. The duration of the fatal illness was twenty-one days.

Autopsy. Performed three hours after death. The body is that of a large-framed, muscular man with abundant subcutaneous fat. *Peritoneal cavity:* The omentum, which contains a large quantity of fat, is adherent in the neighborhood of the operation wound to the anterior abdominal wall by light, fibrinous adhesions. Its surface is thickly studded with conspicuous opaque, white areas, varying in size and shape, but usually round and about 3 mm. in diameter, extending about 1.5 mm. below the surface. On section similar foci are found embedded in the fat. Opaque, white areas are present in the fat of the mesentery, where they are most abundant near its intestinal margin, in the subperitoneal fat of the anterior abdominal wall, over the bladder, over the kidneys, and about the colon. *Abscess cavity:* The drainage-tube inserted into the abdominal wound passes through a small, incised opening in the great omentum and enters an immense abscess cavity which occupies approximately the site of the lesser peritoneal cavity. The foramen of Winslow is closed. The stomach is pushed upward and forward, and its anterior surface is adherent to the lower surface of the liver to the left of the gall-bladder. The spleen, partially surrounded by fat containing many opaque, white areas, is bound by fibrous adhesions to the diaphragm. The walls of the cavity are very irregular and ragged, and have a necrotic appearance, in general opaque and gray, occasionally black. This blackish-gray appearance extends only a short distance below the surface, and where the wall is formed by fat give place to numerous foci of opaque, white color. The retroperitoneal fat in front of the left kidney and psoas muscle has been eroded, and an extension of the cavity passes behind the jejunum near its junction with the duodenum. To the left of the descending portion of the duodenum, occupying the position of the pancreas and projecting forward into the abscess cavity, is a great mass of black material, necrotic in appearance, extending to the left as far as the spleen. This material is reddish-black on section, somewhat spongy in texture, soft, dry, and friable. The cavity contains a large quantity— at least 500 c.c. of fluid reddish-gray material, containing fat droplets and black, necrotic particles.

Liver. The organ is flaccid in consistence; the cut surface has a brownish-red color; lobulation is well marked. The bile-ducts are slightly dilated, and contain thin, yellow bile. The gall-bladder is

bound by numerous adhesions to the duodenum and stomach. Its walls are thickened, and it is much distended, containing viscid, yellow bile and a large number—over one hundred—of brown, faceted calculi, varying in diameter from 0.5 to 1 cm. The hepatic, cystic, and common ducts are much dilated. On opening the duodenum a stone is felt below the mucous membrane, situated in the common bile-duct, about 1.5 cm. from the orifice of the diverticulum of Vater. It is 7 mm. in diameter and resembles those present in the gall-bladder. *Pancreas:* The pancreatic duct unites with the common bile-duct at a point 7 mm. from the duodenal orifice. For a distance of 1.5 cm. the two ducts are separated by a thin septum only, and in contact with this septum is lodged the gallstone previously mentioned. The pancreatic duct is not distended. The pancreas occupies the posterior wall of the lesser peritoneal abscess cavity, and is covered by the mass of reddish-black, friable material, changed coagulated blood, above described. The organ is of large size, and the glandular tissue is in great part firm, yellowish-white, and well preserved. The interstitial tissue has a dull reddish, in places hemorrhagic, appearance, and contains conspicuous opaque, yellow areas of irregular shape. Where the anterior surface of the head and body is in contact with the overlying material there is a superficial zone of soft, grayish, necrotic appearance.

The other organs—heart, lungs, spleen, stomach, intestines, and kidneys—present no noteworthy alteration.

Histological Examination. The foci of fat necrosis consist of a central mass of necrotic material, in which the outlines of the fat cells are in most places preserved, though the nuclei have disappeared, and a peripheral zone of cell proliferation. The latter consists in part of large, round cells, with round or slightly irregular, deeply staining nucleus and granular or vacuolated cell body. Multinuclear cells of similar appearance are present. About neighboring bloodvessels lymphoid and plasma cells are accumulated in moderate number, together with an occasional polynuclear leucocyte.

The interstitial tissue of the pancreas is much increased, wide bands of fibrous tissue containing in places lymphoid and plasma cells, separate groups of lobules. Numerous irregularly shaped cells filled with brownish-yellow pigment granules, which give the Prussian-blue reaction for iron, afford evidence of former hemorrhage. In a few places well-preserved red corpuscles are diffusely scattered in the tissue. Foci of necrotic fat are present. Many acini are widely dilated ; their cells are flat and the lumen is much distended, containing products of secretion and occasionally one or more polynuclear leucocytes. In an area corresponding to the zone of necrotic appearance before mentioned, nuclei no longer stain, and the architecture of the glandular tissue is only obscurely distinguishable. A thick band of newly formed fibrous tissue containing an occasional acinus or duct separates the necrotic parenchyma from that which is still intact. The mass covering the pancreas is found to consist of altered blood ; upon and immediately below its surface are numerous polynuclear leucocytes.

Sections of the diaphragm, stomach, and liver where they form part of the abscess wall show a zone of newly formed fibrous tissue, upon the surface of which are necrotic material and polynuclear leucocytes in great number.

Bacteriological Examination. Cultures from the blood contained in

the heart, from the lung, and from the liver, studied by Mr. V. H. Bassett, were found to contain the bacillus coli communis. A plate culture from the material covering the pancreas, and forming part of the abscess wall, contained the B. coli communis, the B. lactis aërogenes, and the B. proteus vulgaris.

Anatomical Diagnosis. Cholelithiasis; calculus lodged in the common duct near its orifice; slight jaundice. Old hemorrhage within and about the pancreas; localized necrosis of pancreas; chronic interstitial pancreatitis; necrosis of fat of pancreas, greater and lesser omentum, mesentery, and subperitoneal tissue of abdominal wall. Peripancreatic abscess limited by lesser peritoneal cavity. Laparotomy wound.

Symptoms occurring six months before the fatal illness indicated the passage of a calculus along the common duct, and this diagnosis was confirmed at autopsy by the presence of numerous calculi in the gallbladder. The second attack began suddenly, three weeks before death, with severe nausea and vomiting, accompanied by intense, cramp-like pain in the abdomen. Tenderness was present in the right hypochondriac region, and on admission to the hospital the patient was slightly jaundiced. A mass was felt in the epigastrium; there was irregular fever and a leucocytosis of 18,000 to 19,000. The diagnosis of acute suppurative pancreatitis was made.

The autopsy disclosed a small gallstone lodged in the common bileduct, a short distance from its orifice, in such a position that it might readily have compressed and occluded the duct of Wirsung, here separated from the bile-duct by a thin, almost membranous septum. The lesser peritoneal cavity was the site of a large abscess, whose walls were formed in large part by necrotic fat; the subperitoneal tissue was studded with conspicuous opaque, white foci of fat necrosis. The pancreas was in great part well preserved, but its interstitial tissue was increased and gave evidence of having been the seat of hemorrhage. The anterior surface of the pancreas was covered by a considerable quantity of old, clotted blood, having the dark appearance of gangrenous tissue and forming the tumor mass, which was palpable during life. A superficial zone of gland parenchyma in contact with this material was necrotic. There was evidence of duct obstruction; though the larger ducts were not dilated, many alveoli were dilated, and there was an increase of interstitial tissue.

Since jaundice was slight and the pancreatic duct was not dilated, it is probable that the calculus produced only temporary obstruction of the two ducts. Nevertheless, one may fairly assume that the primary cause of the lesions in and about the pancreas was an interference with the outflow of the pancreatic secretion. In support of this conclusion I have been able to collect from the literature a number of cases in which, associated with a lesion of the pancreas or with necrosis of the

surrounding fat, usually with both conditions, a gallstone was found lodged in the common duct near its orifice, where it could compress the pancreatic duct, or, perhaps, free in the duodenum, the common duct being dilated (Cases I. and V.). In the latter case there could be little doubt that it has shortly before occupied the first-named position.

CASE I.[1]—Male, aged sixty years. During sixteen months the individual had suffered attacks of pain, followed by jaundice. He was suddenly attacked with severe pain in the left hypochondriac and epigastric regions. Collapse preceded death, which followed within thirty-four hours after the onset of symptoms. The thickened gall-bladder contained over a hundred calculi. The common bile-duct was dilated to the size of the little finger, and in the duodenum was a calculus the size of a hazel-nut. The pancreas was large, grayish-pink or reddish-gray, mottled with reddish-brown. Surrounding fat was moderately infiltrated with blood, and contained foci of necrosis.

CASE II.[2]—Male, aged forty-nine years. For several months the patient had suffered with pain in the epigastrium, at times in the right hypochondrium. His stools were occasionally clay-colored, and once he was jaundiced. About sixteen hours before death he was suddenly attacked with vomiting and severe epigastric pain, followed by collapse. " The gall-bladder contained one small concretion of inspissated bile ; two others were lodged in the duodenal extremity of the common duct." The body and tail of the pancreas were enlarged and infiltrated with blood, exuding a chocolate-colored fluid. In the neighborhood of the gland were foci of fat necrosis.

CASE III.[3]—No clinical history is given. In the common duct close to its orifice was a gallstone ; others are present in the duct behind it and in the gall-bladder. The body and tail of the pancreas were beset with green and yellow points, the tail being almost completely necrotic. Old and recent hemorrhages occur. Microscopical examination demonstrated the presence of suppurative inflammation, having its origin apparently in the ducts.

CASE IV.[4]—Female, aged fifty-eight years. For fifteen years she had suffered with severe attacks of indigestion, on one occasion followed by jaundice ; pain in the right hypochondriac region occurred during the later attacks. Four days before death she was seized with pain in the right hypochondrium, accompanied by vomiting, chill, and fever, and followed by jaundice. A small gallstone was found at the outlet of the common duct ; others were present in the gall-bladder. The pancreas was enlarged, surrounded and infiltrated with blood. Numerous foci of fat necrosis were seen in its neighborhood.

CASE V.[5]—Female, aged forty-eight years. The patient stated that she had suffered for years with stomach and liver trouble. Illness began five days before death, with vomiting, constipation, and abdominal distention ; jaundice followed. The thickened gall-bladder contained three large concretions. In the duodenum was a stone the size of a

[1] Thayer. Boston Med. and Surg. Journ., 1889, vol. cxxi. p. 506.

[2] Day. Ibid., 1892, vol. cxxvii. p. 569.

[3] Dieckhoff. Festschr. f. Prof. Thierfelder. Leipzig, 1895.

[4] Cutler. Boston Med. and Surg. Journ., 1895, vol. cxxxii. p. 354.

[5] Fraenkel. Münchener med. Wochensch., 1896, vol. xliii. pp. 814, 844.

cherry, and the papilla biliaria was gaping. In the interstitial tissue of the pancreas, which was fairly firm, were foci of fat necrosis ; otherwise the organ appeared to be normal. Areas of necrosis were present in the fat of the greater and lesser omentum and of the appendices exploica.

CASE VI.[1]—Female, aged thirty-eight years. The individual was suddenly seized forty-two hours before death with vomiting and pain in the upper part of the abdomen, followed by symptoms of collapse. A gallstone, about the size of a pea, was found projecting from the orifice of the common duct into the duodenum. Other calculi were found in the gall-bladder and common bile-duct. The pancreas was enlarged, and its appearance of intense injection was evidently due to inflammatory change. Slight peritonitis was present.

CASE VII.[2]—Male, aged forty-one years. The patient was suddenly attacked with vomiting and severe abdominal pain. Collapse preceded death, which occurred at the end of forty-four hours. A small, cubical gallstone projected from the end of the common duct into the duodenum ; similar concretions were found in the gall-bladder. The pancreas was greatly enlarged, weighing 525 grammes, and mottled with areas of reddish-brown color, due to hemorrhagic infiltration of its interstitial tissue. The organ was surrounded by semifluid, clotted blood, of dark-brown color. The intima of the splenic artery was of a dirty-blue color, and apparently necrotic about 2 cm. from the aorta ; the writer regards this vessel as the source of the hemorrhage, although it is not stated that rupture had occurred.

In the preceding eight cases a calculus had lodged in the common bile-duct near its orifice, or, having been expelled from this position shortly before death, lay in the duodenum, leaving the common duct dilated. Necrosis of the fat in or about the pancreas occurred in seven of these eight cases ; in the report of the eighth case (No. 6), briefly described several years after its occurrence, no reference is made to this change. Even in the absence of gross lesions of the gland, as in Case No. 5, the occurrence of fat necrosis is not surprising, since the experiments previously mentioned have shown that simple duct ligation is followed by this change. In the remaining cases macroscopical alterations were observable.

In five instances recent hemorrhages had occurred into the organ, but, microscopical examination being omitted, it is difficult to determine whether these cases should be classified as examples of simple hemorrhage or of hemorrhagic pancreatitis. In the case which I have recorded there was evidence of past hemorrhage into and about the pancreas, accompanied by necrosis of a small portion of the organ. The remainder of the gland was the seat of chronic interstitial change, and apparently, as the result of invasion of micro-organisms into the hemorrhagic and necrotic tissue, an abscess, limited by the lesser peri-

[1] Kennan. Brit. Med. Journ., 1896, vol ii. p. 1442.

[2] Simpson. Edinburgh Med. Journ., 1897, vol. ii. p. 245.

toneal cavity, had formed about the organ.   In Case No. 3 there were
old and recent hemorrhages into the pancreas, which had undergone
suppurative inflammation and necrosis.

Of special interest are the four cases (Nos. 1, 2, 6, and 7) in which
death occurred within thirty-three, sixteen, forty-two, and forty-four
hours after the onset of sudden vomiting, pain in the upper abdomen,
and collapse.   The brief duration of symptoms indicates that the cal-
culus found at autopsy had been lodged a short time only in the com-
mon duct.   Nevertheless, extensive lesion of the pancreas, hemorrhagic
in character, had resulted..   In the study of reported cases it is often
difficult to distinguish between hemorrhage into the pancreas and
hemorrhagic pancreatitis.   Indeed, the relation which the two condi-
tions bear to one another is not clear.   Various writers discuss the
possibility of hemorrhage without pre-existing inflammation.   Is hemor-
rhage the result of preceding inflammatory changes, or is inflammation
a consequence of the secondary infection of an organ already the seat
of hemorrhage ?   Histological and experimental studies have failed to
explain the etiology of the two conditions.

Ligation of the pancreatic ducts in animals does not cause hemor-
rhage or hemorrhagic inflammation.   By injecting the bacillus pyo-
cyaneus and the bacillus diphtheriæ into the pancreatic duct, Flexner[1]
obtained intensely hemorrhagic inflammation of the gland in several
instances within forty-eight hours.   It is conceivable that partial occlu-
sion of the pancreatic duct associated with the invasion of the retained
secretion by micro-organisms from the duodenum might cause a similar
hemorrhagic lesion.

Should a calculus lodge so firmly in the common bile-duct as to cause
obstruction to the outflow of the pancreatic secretion, one would also
expect occlusion of the bile-duct and consequent jaundice.   Where
death rapidly follows, as in Cases Nos. 1, 2, 6, and 7, its absence is not
surprising.   Jaundice was present in Cases Nos. 4 and 5 ; in the case
which I have recorded it was present in slight degree.   The occurrence
of advanced lesions in cases which have died within forty-eight hours
after the onset of symptoms shows that a profound alteration might be
produced by the transient impaction of a calculus, perhaps of insuffi-
cient duration to produce jaundice.

The preceding cases include only those in which there is positive
evidence that a stone passing along the common bile-duct had become
impacted in such position that occlusion of the pancreatic duct might
ensue.   A calculus might be temporarily so located and cause severe
injury to the gland, but finally, being expelled, give no evidence of its
former impaction.   I have collected from the literature a number of
cases in which pancreatic lesions and fat necrosis were associated with

cholelithiasis. Gallstones were found in the gall-bladder or gall-ducts, but at autopsy there was not convincing evidence, as in the previously cited cases, that a stone in the common duct had occluded the pancreatic duct. In one of these cases (No. 9) a calculus had found its way into the pancreatic duct and caused suppurative inflammation.

No.	Author.	Duration.	Pancreas.	Fat necrosis.
1	Thayer[1]	34 hours	Hemorrhagic	Present.
2	Day[2]	16 hours	Hemorrhagic	"
3	Dieckhoff[8]	....	Hemorrhagic, purulent, and gangrenous	"
4	Cutler[4]	4 days	Hemorrhagic	"
5	Fraenkel[5]	5 days	....	"
6	Kennan[6]	42 hours	Hemorrhagic.	
7	Simpson[7]	44 hours	Hemorrhagic	Present.
8	Opie[8]	21 days	Hemorrhagic and gangrenous	"
9	Dieckhoff[3]	2 days	Purulent	"
10	Rolleston[9]	2 days	Hemorrhagic	"
11	Paul[10]	30 hours	Hemorrhagic.	
12	J. A. Smith[11]	24 hours	Hemorrhagic.	
13	Chiari[12]	7 days	Gangrenous	Present.
14	Chiari[13]	3 weeks	Gangrenous	"
15	Mader[14]	13 days	Gangrenous	"
16	Fitz[15]	10 days	Gangrenous	"
17	Simon and Stanley[16]	3 days	Purulent	"
18	Morian[17]	27 days	Hemorrhagic and gangrenous	"
19	Habersohn[18]	4 months	Gangrenous.	
20	Chiari[13]	2 months	Gangrenous.	
21	König[19]	32 days	Gangrenous	Present.
22	Rolleston[9]	2½ months.	Purulent	"
23	Hawkins[20]	4 days	....	"
24	Körte[21]	4 months	Gangrenous.	
25	Körte[21]	1 month	Hemorrhagic and gangrenous	Present.
26	Stockton & Williams[22]	3 weeks	....	"
27	Fraenkel[23]	....	Gangrenous	"
28	Fraenkel[23]	5 days	Hemorrhagic and gangrenous	"
29	Flexner[24]	....	....	"
30	Ehrich[25]	1 month	Gangrenous	"
31	Scott[26]	15 days	Gangrenous	"
32	Grawitz[27]	32 days	Gangrenous	"

[1] Boston Medical and Surgical Journal, 1889, vol. cxxi. p. 506.

[2] Ibid., 1892, vol. cxxvii. p. 569.

[3] Festschrift f. Prof. Thierfelder, Leipzig, 1895.

[4] Boston Medical and Surgical Journal, 1895, vol. cxxxii. p. 354.

[5] Münch. med. Wochensch., 1896, vol. xliii. p. 813.

[6] British Medical Journal, 1896, vol. ii. p. 1442.

[7] Edinburgh Medical Journal, 1897, vol. ii. p. 245.

[8] See above.

[9] Transactions Pathological Society, London, 1893, vol. xliv. p. 71.

[10] Boston Medical and Surgical Journal, 1894, vol. cxxx. p. 8.

[11] British Medical Journal, 1897, vol. ii. p. 468.

[12] Wiener med. Wochensch., 1876, vol. xxvi. p. 291.

[13] Ibid., 1880, vol. xxx. pp. 139, 164.

[14] Bericht d. k. k. Krankenanstatt Rudolfs-Stiftung, 1884; 1885, pp. 371, 435.

[15] Medical Record, 1889, vol. xxxv. pp. 197, 225, 253.

[16] Lancet, 1897, vol. i. p. 1325.

[17] Münch. med. Wochensch., 1899, vol. lxvi. p. 348.

[18] Diseases of the Abdomen, 1878, 3d ed., p. 338.

[19] Inaug. Diss., Kiel, 1889.

[20] Transactions Pathological Society, London, 1893, vol. xliv. p. 78.

[21] Arch. f. klin. Chir., 1894, vol. xlviii. p. 721.

[22] AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1895, n. s., vol. cx. p. 251.

[23] Münch. med. Wochensch, 1896, vol. xliii. pp. 813, 844.

[24] Journal of Experimental Medicine, 1897, vol. ii. p. 413.

[25] Beiträge z. klin. Chir., 1898, vol. xx. p. 316.

[26] AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1899, n. s., vol. cxviii. p. 414.

[27] Münch. med. Wochensch., 1899, xlvii. p. 813.

The first eight cases of the table are those already cited.

A hemorrhagic lesion of the pancreas, hemorrhage or hemorrhagic pancreatitis, was present in Cases Nos. 10, 11, and 12. Gallstones were found in the gall-bladder or in the bile passages, but there is no record that a calculus was located near the orifice of the common duct. Jaundice was absent, and the autopsy gave no positive evidence that a stone had recently passed into the duodenum. Death followed within forty-eight hours the onset of symptoms, abdominal pain, vomiting, and collapse. The clinical and pathological picture agrees with that of the preceding cases of rapidly fatal hemorrhagic lesion (Nos. 1, 2, 6, and 7). One factor alone is absent : the offending calculus has apparently been passed into the intestine and lost.

When, it may be, with a history of previous gallstone colic, the fatal attack is accompanied by evidence of the passage of a calculus along the common duct, notably pain and jaundice, and calculi are found in the bile passages after death, though none are found near the orifice of the common duct, one is justified, in view of the more conclusive cases mentioned (Nos. 1 to 8), in assuming that the pancreatic lesion was caused by a calculus temporarily occluding both ducts, but finally expelled and evacuated. The reports of cases Nos. 13 to 18 show that they fulfil these conditions ; in all of them well-marked jaundice was present.

In the remaining cases (Nos. 19 to 32), although death did not follow shortly after the onset of symptoms, jaundice was not present, and the clinical history gives insufficient evidence that a stone had passed along the common duct. It is not improbable that in some of these cases the association of pancreatic lesion and cholelithiasis was accidental. On the other hand, it is well known that jaundice does not always follow the passage of a calculus through the common duct. Cases cited above have shown that extensive hemorrhagic lesion of the pancreas may be caused by a stone which has only a short time occluded the pancreatic duct. Where death has not followed rapidly the onset of symptoms, gangrenous pancreatitis, often with evidence of old hemorrhage, is observed.

The cases of acute pancreatic lesion recorded in the literature are not numerous ; the relatively large number which have been found associated with cholelithiasis indicates an intimate relation between the two processes, and in view of the facts above noted it is fair to assume that with few exceptions the pancreatic lesion in the collected cases was caused by the presence of gallstones. They number thirty-two.

In twenty-six cases fat necrosis was present. In three of the six cases where it was absent (Nos. 6, 11, and 12) death occurred very soon after the onset of symptoms. In four instances (Nos. 5, 23, 26, and 29) fat necrosis was present, though no gross lesion of the pancreas was noted.

In seven cases (Nos. 1, 2, 6, 7, 10, 11, and 12) death followed the onset of symptoms—abdominal pain, vomiting, and collapse—within forty-eight hours, and at autopsy hemorrhagic infiltration of the pancreas was present. In an eighth case (No 4) death followed in four days. In these cases, as mentioned above, it is not possible to determine whether the gland was the seat of simple hemorrhage or of hemorrhagic pancreatitis. It is probable that the lesion is that usually described as hemorrhagic pancreatitis ; here the organ is infiltrated with blood, and there is necrosis of greater or less extent combined with inflammatory changes.

In the great majority of the cases where the fatal illness was of longer duration the pancreas presented the lesion usually described as gangrenous pancreatitis. This condition was present in seventeen cases. The organ is dry, friable, blackish, and necrotic in appearance. Old, changed blood frequently gives evidence of former hemorrhage, and there can be little doubt that this so-called gangrenous pancreatitis represents a late stage of the hemorrhagic lesion. In a large proportion of such cases infection of the injured organ and of the necrotic fat occurs, presumably from the duodenum, and a peripancreatic abscess results, usually limited by the wall of the lesser peritoneal cavity whose fat has become in large part necrotic.

In three cases (Nos. 9, 17, and 22) the pancreas was the seat of suppurative inflammation, apparently without hemorrhage or necrosis. In one of them (No. 9) a gallstone had found its way into the pancreatic duct.

The cases previously cited include only acute lesions of the pancreas. Accompanying long-continued occlusion of the pancreatic ducts one usually observes chronic changes in the gland, chronic interstitial inflammation, dilatation of the ducts, and occasionally the formation of retention cysts. Phulpin[1] has recorded a case in which a stone lodged for a long time near the junction of the common bile-duct and duct of Wirsung occluded both :

A woman, aged seventy-four years, had suffered with jaundice for a year and a half. At autopsy the gall-bladder was found to contain numerous faceted calculi the size of pease. The common bile-duct was so dilated that its diameter almost equalled that of the small intestine. At a point about 2 cm. from its orifice it assumed its usual size, and here was lodged a calculus similar to those found in the gall-gladder. Irregularly scattered in the body and tail of the pancreas were a score of cysts the size of hazel-nuts. The duct of Wirsung was dilated to the size of the index finger. Passing toward the duodenum the dilatation ceased at a point where the pancreatic duct comes in contact with the common bile-duct before traversing with it the wall of the duodenum and opposite the calculus lodged in the common duct. No accessory pancreatic duct could be found.

[1] Phulpin. Bull. Soc. Anat. d. Paris, 1892, vol. lxvii. 5me. S. 6.

In two cases recently reported by Mayo Robson,[1] where operation was performed for removal of gallstones from the common duct, the head of the pancreas was found so indurated that a diagnosis of malignant growth was made. In one of these cases autopsy demonstrated the presence of chronic interstitial pancreatitis. Since in the second case the subsequent history disproved the diagnosis of malignant disease, Robson thinks that here also chronic pancreatitis was present.

In the following case chronic interstitial pancreatitis and fat necrosis was associated with cholelithiasis:

Anatomical Diagnosis. A. G., female, aged fifty years. Cholelithiasis; calculi in gall-bladder, cystic, hepatic, and common bile-ducts. Focal necrosis of liver and acute suppurative inflammation of bile-ducts. Adenocarcinoma of the gall-bladder; metastases in liver. Jaundice. Chronic interstitial pancreatitis. Peripancreatic fat necrosis. Hemorrhage into the gastro-intestinal canal; submucous ecchymosis. Acute spleen tumor; ascites.

Synopsis of Autopsy Protocol. The body is that of a large, well-nourished woman, deeply jaundiced.

The liver, weighing 2250 grammes, has a dark, greenish-yellow color; the bile-ducts are dilated. On the upper surface of the left lobe are several bleb-like projections, the largest 8 mm. across, containing yellow, pus-like fluid. The gall-bladder notch is deep, and the surface of the liver in its neighborhood is much puckered. On freeing adhesions with the duodenum the gall-bladder is found to be firmly contracted over a number of faceted concretions of an average diameter of about 12 mm. The inner surface of the cavity is rough and irregular in shape; its wall where it comes in contact with the under surface of the liver has an average thickness of 6 mm., and is formed by dense, gray-white tissue, which sends short projections upward into the liver substance. Sparsely scattered throughout the liver are small nodules, usually about 5 mm. in diameter, composed of similar tissue. The cavity of the gall-bladder communicates with a second cavity of considerable size, representing apparently the junction of the hepatic, cystic, and common bile-ducts, and containing two faceted stones, each about 1 cm. in diameter. Otherwise the common duct is not markedly dilated, having a circumference of 4 mm., but its walls are somewhat thickened and fibrous.

The pancreas is very firm in consistence, and is infiltrated with and embedded in fat. In the body of the organ are several conspicuous areas of irregular shape, 2 or 3 mm. across, composed of opaque, yellowish-white material. Similar foci of smaller size are sparsely scattered in the interstitial fat throughout the organ. The lumen of the duct of Wirsung is conspicuous, but not markedly dilated.

Histological Examination. Foci of necrosis and of acute inflammation are present throughout the liver. The tissue replacing the gall-bladder where it comes in contact with the liver and the nodules throughout the organ have the structure of adenocarcinoma.

The interstitial tissue of the pancreas is increased throughout the gland, most markedly in the tail, and the normal lobulation of the

[1] Lancet, 1900, vol. ii. p. 235.

gland is much more distinct thau usual. Fat is very abundant, and contains foci of necrosis surrounded by cells of lymphoid and epithelioid type in moderate number, together with many polynuclear leucocytes. The medium-sized ducts are much dilated, their cells are flattened, and they contain products of secretion, desquamated cells, and occasionally a few polynuclear leucocytes. In general the acini are normal in appearance, but many are considerably dilated and contain an occasional polynuclear leucocyte.

In the preceding case the changes in the pancreas are those which usually follow duct obstruction; the ducts throughout the gland are dilated, the interstitial tissue between groups of lobules is much increased, and contains foci of fat necrosis. The common bile-duct, which is the seat of chronic inflammation, contains numerous calculi, and one may readily believe that the pancreas has suffered during the expulsion of gallstones.

The preceding study has shown that where anatomical conditions are favorable disease of the pancreas may occur as a complication of cholelithiasis when a calculus passes along the common bile-duct. The lodgement of a stone near the orifice of the bile-duct, where it may at the same time compress and occlude the duct of Wirsung, is not uncommonly a cause of pancreatic lesions and disseminated fat necrosis. Should a calculus become impacted in this position the preceding cases have shown that one of several conditions may result:

1. An individual, usually in fairly good health, with perhaps a history of previous gallstone colic, is suddenly attacked with pain in the epigastric region, accompanied by vomiting and followed by collapse. Death follows usually within forty-eight hours, and at autopsy gallstones are found in the bile passages, while that one which caused the fatal attack may be still lodged in the common duct near its orifice. The pancreas is enlarged, infiltrated with blood, and hemorrhage may have occurred into the surrounding tissue. Foci of fat necrosis are usually present.

2. A fatal termination may not follow rapidly the symptoms mentioned. Pain in the epigastrium persists, jaundice may be present, and a tumor mass above the umbilicus may indicate a probable lesion of the pancreas. At the end of one or more weeks or months death occurs, often with symptoms indicating the presence of suppurative inflammation, presumably in the neighborhood of the gland. At autopsy the diagnosis of cholelithiasis is confirmed by the presence of gallstones in the gall-bladder or in the bile-ducts, and occasionally the offending calculus is still lodged near the junction of the common bile-duct and the duct of Wirsung. The pancreas is dry, black, and necrotic, and evidence of previous hemorrhage may be present. Secondary infection has occurred and the pancreas lies in an abscess cavity formed by the bursa omentalis. In the wall, and often widely disseminated in the

abdominal fat, are foci of necrosis.   Since the individual has survived the primary lesion opportunity has been given for the development of secondary changes in the injured pancreas and neighboring fat.

3. In certain instances long-continued or repeated obstruction of the pancreatic duct by gallstones does not cause the acute lesions described, but produces chronic inflammatory changes.

A REPORT OF A CASE OF TYPHOID PLEURISY.

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Pleurisy is not a common complication of typhoid fever; when present it is ordinarily secondary to pneumonia, to an infarction, or to gangrene.   Primary pleurisy is regarded as very rare.   Bacteriological study usually shows the presence of the more common members of the pyogenic group of micro-organisms.   However, a few isolated reports in literature demonstrate the etiological relationship of the typhoid bacillus to certain cases.   Thus fifteen years ago Rendu and de Gennes[1] claimed to have isolated the bacillus typhosus from the pus of an empyema.   Two years later A. Fraenkel[2] reported a similar case.   These reports were followed by others.   In 1889, Valentini[3] isolated the typhoid organism from a purulent pleural exudate; then Mya and Belfanti,[4] in 1890, from a pleural abscess; and Weintraud[5] still later from a case of purulent pleurisy.   More recently other examples have been published by Dineur,[6] Gerhardt,[7] and Souques, Lesnè and Ravaut.[8]

The history of the case reported by us is as follows:

The patient, a physician, aged fifty-seven years, was seen by Dr. Gordinier in consultation at Schaghticoke, N. Y., July 14, 1899.   He presented the following history: In 1858, was ill several weeks with inflammatory rheumatism.   In 1862, had, while in Virginia, typhus

[1] Rendu and de Gennes. La France Médicale, 1885, vol. ii. p. 1821.
[2] A Fraenkel. Verhandlung sechste Kongress f. Inner. Med., 1887, p. 179.
[3] Valentini. Berl. klin. Wochenschrift, 1889, p. 368.
[4] Mya and Belfanti   Giornale d. Acad. di Med. di Turino, January, 1890.
[5] Weintraud. Berlin. klinische Wochenschrift, 1893, p. 345.
[6] Dineur. Bull. de l'Acad. Royale de Med. de Belgique, 1897.
[7] Gerhardt. Mittheilungen a. d. Grenzgebieten der Med. u. Chir., Bd. 1900, Heft 1.
[8] Souques, Lesnè and Ravaut. Bull. et Mém. de la Soc. Med. de Paris, January 25, 1900.

fever. In 1885, was sick four months with what was diagnosed as typhoid fever; since that illness has been in comparatively good health, save that he has suffered frequently with labored breathing on ascending hills or stairs, or after any violent exercise. Has had on several occasions slight œdema of ankles. On July 10, 1899, patient was obliged to take to his bed, having previously suffered for several days with malaise, loss of appetite, disinclination to work, together with headache, pains in muscles and joints, and colicky pains in abdomen. Bowels were constipated.

Present Condition. Patient slightly built, with ill-developed and flabby musculature. Lips, ears, and fingers very cyanotic, face dusky. Respiration 60, pulse 120, small and irregular, arteries not thickened. Temperature 103°. Tongue coated with yellowish fur. No œdema, veins of chest and abdomen not prominent, abdomen distended, no rose spots. Heart's apex diffuse in left fifth interspace just outside the nipple line, distinct epigastric pulsation. At apex a well-marked presystolic thrill was felt, and there was heard a presystolic murmur, followed immediately by a soft systolic murmur, which latter murmur was conducted to the axilla; second sound at base reduplicated. Liver dulness in fourth interspace extending downward one inch below costal border; splenic dulness distinctly increased, extending downward, forward, and inward. Lungs anteriorly hyper-resonant, with prolonged low-pitched expiration; posteriorly at bases slight dulness, with fine, liquid rales; abdomen very tympanitic; slight tenderness in right iliac fossa.

Diagnosis. Probably typhoid fever, with œdema and congestion of the lungs, the result of cardiac failure. Ordered nitroglycerin, digitalis, and strychnine. On returning home examined the urine, which gave a distinct diazo reaction, and in addition contained a trace of albumin with a few hyaline casts. The blood showed a positive Widal reaction, no leucocytosis, no plasmodia.

July 17*th.* Visited the patient again and found his general condition much improved, his pulse more regular and less rapid, and his cyanosis disappearing. The heart was more steady, and the sudden sharp slap of the first sound following in the wake of the presystolic murmur was very marked. The liquid rales at the base of the left lung had entirely disappeared, and in their stead a distinct vesicular murmur was detected. At the base of the right chest posteriorly flatness existed, together with absence of voice sounds and vesicular murmur, this flatness extending into the axillary region, where opposite the fifth rib a friction sound was audible. Temperature 102.5° F., and he had had fever continuously since my first visit.

19*th.* Was called again, and found the physical evidences of a large, right-sided pleural effusion. In consideration of the displaced position of the already crippled heart it was deemed wise to remove the exudate at once. Accordingly I aspirated two quarts of a greenish-yellow, opalescent fluid, with much temporary relief.

24*th.* Owing to recurrence of extreme dyspnœa he was again tapped, a little less than two quarts of a similar colored fluid being removed. This fluid was examined by Miss Beale, a daughter of the physician in attendance, who found a motile organism in it.

On July 30th I had occasion to again aspirate him, removing twenty ounces of fluid, more milky in character and of much greater consist-

ency.   This fluid was received in a sterile vessel and examined micro-
scopically.   It contained numerous bacilli actively motile and having
the morphological appearances of the typhoid or colon bacillus.

Bacteriological Report.   The exudate was placed in a sterile vessel
and sent to the Bender Hygienic Laboratory.   Four agar-agar plates
were then immediately made, using 1 c.cm. of the exudate for each
plate.   At the end of forty-eight hours of incubation at 37° C. a few
discrete, gray, pinhead-sized, finely granular colonies were observed in
all the plates.   The plate in which they were most numerous contained
twenty-six colonies; that containing the smallest number showed
eleven colonies.   For the most part all the colonies resembled each
other in appearance.   Many cover-slip preparations were made from
different colonies and from the various plates; invariably the same
rather short, moderately thick bacillus was observed.   When stained
by Gram's method this organism was decolorized.   On media the
various cultures from the different plates presented the following gen-
eral reactions:

Agar-agar: Moderately abundant, moist, grayish-white growth.   No
discoloration of the medium.

Gelatin stab: Growth along the entire line of inoculation. No lique-
faction of the gelatin at the end of seventeen days.

Potato: Moderate, glistening, gray, moist growth along inoculation
tract.   No odor.

Litmus milk: Slight acid formation at the end of three days.   No
coagulation of the milk at the end of fourteen days.

Bouillon: Uniformly cloudy.

Dunham: Same appearance as in the bouillon.   No indol at the end
of fourteen days.

Glucose, saccharose, and lactose fermentation broth: No gas forma-
tion at the end of fourteen days.

Hanging-drop preparations showed actively motile bacilli.

The agglutination-test was tried with the serum of three known
cases of typhoid fever; in one case the test was positive in a dilution of
1:110.

Bacteriological Diagnosis.   Bacillus typhosus in pure culture.

For the most part the cases thus far reported have occurred in men;
usually the left side was affected.   Few cases have been reported as
occurring early in the attack of typhoid fever; the third week of the
disease seems to be the favorite time of onset.   One of the most striking
features of these pleurisies incited by the bacillus typhosus is the almost
uniform character of the pleural exudate.   Although hemorrhagic[1] and
serofibrinous exudates[2] occur, in the majority of instances the aspirated
fluid has been found to be purulent in character.   Our own case was no
exception to this rule.

[1] Souques, Lesnè and Ravaut. Loc. cit.

[2] Fernet. Soc. Méd. des hôpitaux de Paris, May 15, 1891. Menètrier. Ibid., December 10
1896.

ASTHENIC BULBAR PALSY.[1]

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WE will give no historical account of asthenic bulbar palsy because Dr. Henry Campbell and Mr. Edwin Bramwell have only recently, in the summer number of *Brain*, published a careful summary of reported cases, and have made a thorough critical study of the literature. It will suffice to say that the first case was reported by Wilks in *Guy's Hospital Reports* in 1877. Wilks' patient was a stout, well-looking girl who could scarcely walk. The weakness seemed to be due rather to lethargy than to palsy. She spoke slowly, and had slight nystagmus. A month later many of the symptoms of bulbar palsy appeared, coming on rapidly in about three days. She spoke indistinctly, swallowed with difficulty, and was unable to cough. The limbs were not palsied. Soon breathing became difficult, and in a few hours she died. In the then state of knowledge it would have been proper to have expected to find organic bulbar disease. None was present. Careful macroscopical and microscopical examination revealed nothing abnormal. In 1879 Erb published a similar case, and from that time till 1886 nothing more was written upon the subject. About sixty cases have been reported, with twenty-three deaths and seventeen necropsies. These figures give a false impression of the death-rate, and the high percentage is due to the fact that neurologists are prone to report fatal cases, and many non-fatal cases are probably not diagnosed. At first it was thought the disease affected only muscles innervated from the bulb, but in recent years it has been found to be more-wide-spread in bodily distribution, and now it is usually described under the title of myasthenia gravis.

For our own work we propose to relate a case that came to necropsy, to discuss another which, though resembling the first in many ways, yet differs enough to make its proper classification doubtful, and to speculate a little, for the matter is still speculative, as to causation.

We are indebted to Dr. Morris J. Lewis for the early history of the first case.

[1] Read at the meeting of the College of Physicians of Philadelphia, November 7, 1900.

A woman, aged nineteen years, and married, came to the dispensary of the Infirmary for Nervous Diseases on April 26, 1899.   Her family history was negative, her personal history unimportant, except that ever since her marriage, in 1897, she had had much trouble and grief —an unwished-for pregnancy and a brutal husband.   In January, 1898, an abortion, probably induced, occurred.   She felt no immediate serious ill effects, but about a year later began to suffer from numbness in the right hand, and later in the left hand, legs, and back.   She could feel touch, pin-pricks, and the contact of objects without diffi-culty.   The numbness was entirely subjective.   Her condition remained the same until a few weeks before she came to the dispensary.   She then rapidly grew weak in the arms and legs, so that she could not easily go up or down stairs, and sometimes fell when walking on a level surface.

Examination.   She walked a little stiffly and as well with her eyes closed as open.   Station was good.   The pupils responded to light.   The arms and legs were weak.   The dynamometer registered fifty in either hand.   The knee-jerks were exaggerated, quick, and equal.   There was no ankle clonus.   The elbow-jerk was exaggerated.   She said she could not feel a sharp prick on the hands or legs, and only slightly on the face.   She was, however, able to pick up a small piece of paper even when blindfolded.   She could distinguish between hot and cold, but said she felt them but slightly.   There was a slight tremor of the hands and head.   The eyelids trembled and drooped somewhat, cover-ing about half of the pupil.   The lids did not come into close apposition on shutting the eyes.   She could raise the lids, but not hold them up long.   The tongue was tremulous, and when protruded turned toward the left.   The respiration rate was twenty-six.   The heart was normal.   The sphincters were under complete control.   There was slight con-traction, but no reversal of the color fields.   She was easily hyp-notized.

She returned to the dispensary a few times, and then was lost sight of until her admission to Dr. Burr's wards at the Philadelphia Hospital on April 23, 1900.

Examination.   A young woman of small frame, moderately well nourished, but somewhat pale.   The head fell slightly forward upon the chest, and the eyelids drooped, partially covering the pupils.   The face lacked expression.   She could lift the head, but said it tired her very much to hold it up.   She could not close the eyelids tightly, nor open them completely ; there was but little power of movement in the frontal muscles, and she could not wrinkle the eyebrows.   Her gait resembled that of a person convalescing from some serious acute disease.   The movements of the arms were weak.   There was no distinct palsy anywhere.   Speech was slow and low-voiced—not aphasic, not par-alytic, but simply weak.   Mastication was slow, and she complained that eating tired her.   Her whole manner and bearing showed languor and weariness, but that something more than mere neurasthenia was present was proven by the fact that the amount of weakness varied greatly in different groups of muscles, being most marked in those in-nervated from the bulb.   The knee-jerks were large, but not spastic, and were easily exhausted.   Neither ankle nor patella clonus was present.   Babinski's reflex was absent ; indeed, the plantar reflex was normal.   There were slight but quite constant choreiform movements

in the face and arms. There was no muscular atrophy of the lips, face, or tongue, and of course none in the extremities. She had difficulty in swallowing, solids seeming to stick in the throat and liquids making her cough. She still complained of numbness in the extremities, but felt touch, pain, and heat and cold well. Dr. Charles A. Oliver examined her eyes and reported : " Vision in each eye is reduced one-half to one-third, that of the right being slightly improved by pin-hole. Pupils are equal in size. Irides respond to light, accommodation and convergence. Extra-ocular movements are very much impeded, especially in outward direction, and more marked to the left. Palsy of convergence in association with a variety of ataxic movements. The eye-grounds are healthy, the fields of vision somewhat concentrically diminished. The patient is unable to close the lids, the action of the left orbicularis being more marked." Her condition remained the same until May 13th, when the difficulty in swallowing suddenly became very great, the temperature rose to 101° F., dyspnœa appeared, the pulse was rapid and weak, cyanosis and coma developed, and she died the next morning.

The necropsy was made the following day ; it revealed nothing. The thoracic and abdominal organs were normal. There was a small calcified focus of tuberculosis at the apex of the left lung, and the spleen was chronically enlarged and its capsule much thickened. The kidneys and adrenals were not diseased in any way. The right ovary was cystic. The thymus gland was enlarged, but there was no other evidence of lymphatic diathesis. The uterus contained a three or four-months' old fœtus. The brain, after hardening in formalin, weighed 1250 grammes. Neither it nor the meninges showed any change on gross examination. The cerebrum was of full size, but the pons and medulla were distinctly smaller than normal. The pons was one-third less in diameter than others which had been hardened in the same way. The spinal cord was unusually broad in the lumbar region, and after removal of the dura showed a median dorsal fissure starting at the third lumbar segment and extending to the fifth. At first sight there appeared to be a distinct bifurcation of the cord, but section revealed a persistence of the posterior median fissure extending down to the commissure. The other regions of the cord were normal.

Microscopical Examination. Serial sections of the cord, medulla, pons, and floor of the third ventricle were stained by the Marchi, Nissl, Weigert, carmine, and nuclear stain methods. In the cord no pathological changes were found. In the medulla there were distinct chromotalytic changes with swelling and displacement of the nuclei in the cells of the upper nucleus of the tenth nerve (nucleus terminis vagi). The other bulbar nuclei, including the twelfth and nucleus ambiguous, were perfectly normal. We expected possibly to find changes in the seventh and third nuclei, but they were likewise normal. Sections of the cortex revealed no changes by any of the above-named methods. Sections from all the cranial nerves were examined. By the Marchi method black dots were seen scattered here and there throughout the twelfth, tenth, eighth, and fifth nerves ; but inasmuch as similar appearances are seen in healthy nerves, or at least in nerves which have performed their functions well, we attribute no significance to them. Examination of the tenth nerve stained with carmine showed an atrophy of some of the nerve fibres, giving the appearance of a sclerosis. In

the tenth and twelfth nerves some swollen axis-cylinders were seen. The muscles showed no pathological changes on microscopical examination.

There are two important questions in the study of this affection : Where is the disease located, and what is its nature ? Morbid anatomy gives no help in answering these questions. In the larger number of necropsies no lesion at all has been found, and in the others the changes have been slight and indefinite, similar to those in our case, and of such a nature as not to prove, scarcely to suggest, that they had anything to do with the symptoms. We are compelled, therefore, to fall back upon general physiological and pathological laws, and to draw inferences from analogous affections. The disease must of course be seated in either the muscles or the motor neurons, and if in the latter it must affect either the upper motor neuron from the cerebral cortex to the bulb or cord, or the lower neuron from the bulb and cord to the periphery or some one part, cell body, or axon, of either. The symptoms are so predominately motor that there is no need to look for disease outside the motor apparatus. The disease has been thought to be muscular, but there is much evidence against it. In a large number of cases it has been found that on applying a tetanizing (faradic) current to the muscles at first a brisk contraction is produced, which gradually becomes feeble, and finally ceases, to reappear if the muscle is allowed a period of rest. With the galvanic current, on the contrary, no such exhaustion of muscular contractility occurs. Now faradism causes contraction essentially by acting through the nerves, galvanism by both the nervous system and the muscle directly. Further, Dr. Farquhar Buzzard, at the suggestion of Dr. Campbell, made the following experiment : A moderate galvanic current was applied to the biceps muscle, and a contraction obtained. The muscle was then faradized until it gave no response to a strong stimulus. Then it was tired out by making the patient flex the elbow against resistance, exerted until all power of flexion was lost. On applying the same strength of galvanic current as used at first an excellent contraction was obtained. Finally, on again applying the faradic current, the muscle was found to be still irresponsive. This experiment points strongly against disease of the muscle. Again, we know of no other affection due to disease of the muscles producing analogous symptoms, whereas organic disease of the bulb is not a little similar. Sudden death, a not infrequent thing in asthenic bulbar palsy, is not a symptom of muscular disease. There are several reasons for believing that the upper motor neuron is not affected. The myasthenic reaction, the exhaustibility of the knee-jerk, the pharyngeal palsy, the dyspnœa, the cardiac palpitation, all are evidence against cerebral disease. There is but little direct postmortem evidence in favor of the bulb as the seat of the disease. The

slight changes that have been found were in it and in the cranial nerves. These changes, though almost certainly insufficient to cause the symptoms, may indicate the action of a toxin. The symptoms certainly point toward the bulb as the part first and most seriously affected. Considering everything we may say with comparative safety that the affection is one of the lower motor neurons, but whether the cell bodies or the axons are first and most affected cannot as yet be determined. The primary seat of disease may be in the motor muscular end-plates.

As to the nature of the disease but little is known. It looks like a toxin disease. It frequently follows some mycotic affection. It kills without visible wound. That poisons arising within or without the body may cause death without producing any discoverable lesion goes without saying. That there are diseases without a visible anatomical basis must be admitted, notwithstanding the dogma that there is never perversion of function without alteration of structure. In our case, as in a few others, we are inclined to believe that pregnancy had some causative influence. She was pregnant at the onset, and again when her disease became manifestly serious. Pregnancy may seriously disturb the normal metabolism of the body, as is shown in the kidney of pregnancy, the multiple neuritis occasionally seen, and the greater predisposition of pregnant women to certain diseases. Again, the smallness of the bulb may have had some influence. This was developmental, not secondary, not due to any acquired disease, not caused by the shrinking of an old sclerosis. What nervous elements were present were normal, but they were fewer than usual, they may have been dynamically weaker. It is possible that the ill-developed bulb was unable to withstand the stress of pregnancy.

The second case is made more difficult to understand by the presence of a singular type of anæsthesia. Sensory symptoms of any kind have been but little pronounced in the cases of asthenic bulbar palsy heretofore observed. Occasionally there is some little aching at the back of the neck and in the shoulders, with, it may be, numbness in the arms. True tactile anæsthesia has never been seen. In the case we are about to relate a very interesting form of anæsthesia was present, namely, asteriognosis, the inability to recognize objects by touch, though simple tactile sense is preserved. This symptom makes the proper classification of the case doubtful ; but as it more closely resembles asthenic bulbar palsy than any other disease, we place it tentatively there. It would be interesting if in the future there should be met with cases of anæsthesia in the distribution of the sensory cranial nerves causing a condition comparable or at least analogous to the motor disease, bulbar palsy. This is a speculation, of course, but it is possible that such a condition may sometime be discovered. Our case then would be a connecting link. The history is as follows :

A young woman, aged twenty-four years, well educated and of excellent intelligence, with a good family and personal history, came to Dr. Burr, in March of this year, complaining of general neurasthenic symptoms and marked pseudo-emotionalism. She dated her illness from an attack of grippe which occurred in June, 1899. Whether this attack was one of influenza vera caused by the bacillus of Pfeiffer, or the so-called influenza nostras of unknown causation, could not be determined. At all events she never completely recovered. She was tired, languid, weak, and subject to spells of crying unaccompanied by any distressing emotional feeling. She did not regard her condition as serious, accepted no medical treatment, and grew steadily worse. A week before she came under observation her left arm began to be numb, and she had trouble in picking up small objects. A day or two later the numbness extended to the left leg, and still later to the right side. At the same time her neck felt somewhat stiff and there was severe pain in the occiput. She had slight vertigo, blurred vision, and occasional diplopia.

Examination revealed a spare, rather pale young woman. She was very emotional, bursting into tears without any cause. In the midst of her weeping she would say in the most matter-of-fact way that she did not know what she was crying about, and would go on talking about matters and things in general, paying but little attention to the lachrymal flood. Gait and station were normal; the knee-jerks were normal. Anæsthesia was absent. There was no deformity of the spine, nor pain on pressure anywhere in its length. Her condition was not regarded as serious. A week later, however, she suddenly developed palsy of the right face, involving the entire side. This was not an hysterical spasm, but a true palsy. A few hours later there came on excruciating pain in both ears, which lasted throughout the night, and required morphia for its relief. When re-examined there were found a little drooping of the eyelids, a little trouble in swallowing, slightly nasal voice, weakness of the muscles of mastication on both sides, but the right facial palsy had improved. On rising she would walk well for a few minutes, but soon would stagger and be compelled to sit down. All movements of the left arm were present, but all were weak, and soon she could not move the fingers or wrist against the slightest resistance. She could not squeeze the dynamometer at all. Power in the right arm and hand was a little greater. At no time was there complete loss of power in the arms. She could always make unresisted movements, but could not even lift a spoon, could not feed herself, and even unresisted movements soon tired her so much that she could not continue them. She could not write a word, could not grasp a pen strongly enough to hold it. In bed the movements of the legs were done weakly, but even at the worst she could stand and walk a little. The legs were never so seriously affected as the arms. She could move the tongue in all directions, but complained that the tip felt as if it had been burnt. There was no muscular wasting anywhere. The electrical reactions were normal, but unfortunately no examination was made for faradic exhaustibility. She had frequent attacks of pain in the occiput and back of the left ear, especially if she sat up in bed with the head unsupported. Palpation of the neck and head did not increase the pain at the time, but after an examination pain was apt to occur. No deformity of any kind was discoverable in the occipital region or in the cervical spine. There was no spasm of the muscles of the neck.

The knee-jerks were normal, and ankle clonus was not present. Touch, pain, and temperature-sense were normal on the arms, legs, and face ; but later, when the power in the arms had returned and she could grasp well, it was discovered that she could not recognize objects by touch. This test, of course, could not be made while she was unable to handle objects. Smell and taste were normal throughout the course of the disease.

Dr. John T. Carpenter examined her eyes and reported as follows : " Central vision normal ; field for form and color strictly normal. No reversal of the fields. No pathological changes in the eye-grounds. Refraction error ; moderate hypermetropia. No diplopia except when red glass interposed, when vertical diplopia results and is constant. Right hyperphoria 2', which is concomitant, not paretic. Ocular movements normal, though both adduction and abduction are below par (15°—5°). The only important factor elicited was the discovery of constant right hyperphoria." The sphincters were under complete control.

On first seeing the patient I did not regard her as seriously ill, but when the facial palsy appeared, followed by the difficulty in swallowing, the nasal speech, and the great muscular weakness, I began to fear a very serious issue, and believed that there was organic disease in the bulb and upper cervical cord or in the neighboring bones. Events proved this was an error, for after a few months she improved rapidly, and now is quite well.

There is no specific in the treatment of asthenic bulbar palsy. Rest is the most important element. The patient should be put to bed ; faradism does harm ; galvanism is of doubtful benefit ; massage is useful. As to medicines, arsenic, in our experience, is the one drug which seems to be of benefit.

A STUDY OF A CASE OF GONORRHŒAL ULCERATIVE ENDO- CARDITIS, WITH CULTIVATION OF THE GONOCOCCUS.

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NOTWITHSTANDING the wide influence of the original assertion of Bumm that gonorrhœal processes remain limited to mucous membranes, the fact has been clearly established that the gonococcus may, under certain conditions, incite the production of a series of lesions in the body tissues generally, as dissimilar in pathological significance as they are varied in their clinical aspects. Such a relationship has been

well shown for certain gonorrhœal complications of the joints, peritoneum, myocardium, and a few other tissues.

The case herein reported belongs to a small group of cardiac infections induced by the micrococcus gonorrhœæ. Although recognition of the possibility of endocardial complication in gonorrhœa is by no means new, the complete bacteriological proofs of its occurrence are few and recent. The bacteriological study begins with the description of the gonococcus by Neisser in 1879, but more particularly from the cultural studies of Bumm in 1885, and especially those of Wertheim in 1892.

The number of cases in which the proof of the purely gonococcal nature of the endocarditis may really be said to be fully shown is still very small; with my own this does not exceed six cases. Any new contribution of this kind will then have some importance and considerable interest.[1]

For the history of the case I am indebted to the staff of the Roosevelt Hospital. It is as follows:

Lofton J., colored, native of the United States, aged twenty years, single, and a bell-boy by occupation, was admitted to the hospital on August 4, 1900, with loss of speech.

Family History. Unknown.

Personal History. Moderately alcoholic; no history of syphilis; has always been healthy to the time of present illness.

Present Illness. Although no statement was obtained from the patient, it has been ascertained that he had been suffering from urethral disease for the last eight weeks. Six weeks ago he was seized with a chill, followed by fever. Similar recurrences two or three times a week since then. He was forced to give up work, but did not go to bed. He is said to have been irrational on several occasions. This condition continued until yesterday morning, when it was observed that the power of speech was gone.

On entrance (August 4th) the following note was made:

Nutrition good; mucous membrane pale; tongue coated, moist, swollen, and with impressions along the edge; upper lip swollen and tender; pulse rapid, soft, good volume, regular in rhythm; radial artery not thickened; pulse 126; respiration 32; temperature 103° F. Facial expression heavy and dull; no prostration; power of articulate speech gone; occasionally appears to comprehend what is said to him, and will obey. Abdomen and extremities seem normal. On the left side a single inguinal gland is enlarged and firm. Examination of the lungs is negative. The apex beat is in the fifth space in the nipple line. A loud, systolic murmur, which is transmitted to the left, is heard at the apex. The liver does not appear enlarged, nor is the spleen palpable.

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[1] Almost the whole bibliography of gonorrhœal endocarditis may be found in Marcel See's Le Gonocoque, Paris, 1895, and Thayer and Lazear's article, A Second Case of Gonorrhœal Septicæmia and Ulcerative Endocarditis, with Observations upon the Cardiac Complications of Gonorrhœa, Journal of Experimental Medicine, 1899, vol. iv. p. 8.

Later. Urine: amber, acid; 1020; no albumin or sugar; urea, 2.1 per cent.; no casts, pus, or blood. Restless, trying to get out of bed; restrained. Involuntary dejection.

August 5th. A purulent urethral discharge was noticed. Same general condition. Iodide of potassium, in 20-grain doses every six hours, and mercury inunctions have been prescribed. (At this time syphilis was suspected.)

6th. Low, muttering delirium continues; takes nourishment badly. Phimosis is present. Circumcision by dorsal incision. Upper lip swollen.

9th. Condition remains unchanged. Urethral irrigations with potassium permanganate instituted.

11th. Patient drank about eight ounces of a 1: 40 carbolic solution from an instrument dish. Stomach washed with magnesium sulphate; no harmful effects therefrom.

The daily bedside notes show very much the same condition until August 17th. The urethral discharge ceased and the irrigations were stopped. The temperature-chart up to this time shows an irregular curve, ranging from 99.5° to 103.4° F.

18th. The blood was examined, with the following result: Hæmoglobin, 80 per cent.; red cells, 4,106,000; white cells, 11,400.

24th. Condition the same. This morning the right elbow-joint was noticed swollen, hot, painful, and tender.

25th. The potassium iodide has been increased to 75 grains.

26th. The elbow-joint is less swollen, but still painful.

27th. The elbow swelling has disappeared, but some pain and tenderness still persist.

31st. Blood examination shows: Hæmoglobin, 54 per cent.; red cells, 3,128,000; white cells, 10,800.

Emaciating rapidly. All the way through the pulse has been between 100 and 150, usually above 130.

This clinical picture persisted until September 5th. The temperature, however, which has ranged from 100° to 102° F., went up on September 3d to 103° F., and the following day to 104° F. On the day of his death, which occurred September 5th at 7 P.M., the temperature was 103.8° F. During the day there had been some epistaxis and also bleeding from the mouth. The post-mortem examination was made fifteen hours after death. The following notes have been taken from the autopsy protocol:

Anatomical Diagnosis. Ulcerative endocarditis of the mitral valve, urethritis, acute splenic tumor with infarction, cloudy swelling of the liver and kidneys, œdema, and congestion of the lungs.

Body of a well-built, moderately emaciated negro. No subcutaneous œdema; no apparent enlargement of the superficial glands. Pupils moderately dilated and equal. Mucous membranes pale. Circumcision wound healed; no scars on glans. Subcutaneous fat pale and scanty.

Abdomen. Both layers of peritoneum smooth; no excess of fluid in the peritoneal cavity; foramen of Winslow patent. Appendix vermiformis passes upward behind the cæcum. Omentum dilated; glands not enlarged; right lobe of the liver extends 3 cm. below the costal margin. Diaphragm: fifth rib on the right side, sixth on the left in the mammary lines.

Both pleural cavities free from fluid.

Pericardium. Both layers smooth and normal; cavity contains about 50 c.c. of clear, yellow fluid.

Heart. Distended with fluid blood and chicken-fat and red post-mortem clots. The endocardium and valves on the right side present no abnormality. Adherent to the margin of the posterior segment of the mitral valve is an extensive and irregular but firmly attached thrombus. At the site of attachment the valve is in part destroyed. The chordæ tendinæ of the involved mitral segment are also in part covered with smaller thrombi; the same is also true of the papillary muscle. The measurement of the projecting thrombus on the mitral valve is variable; in some portions this is 1 cm. The average scarcely exceeds 0.5 cm. The myocardium is firm and, on section, of a homogeneous brownish-red color. Eccentric hypertrophy of the left heart. Coronaries normal.

Lungs. Both lungs present a similar appearance. The pleuræ are smooth; the lungs congested and œdematous. Bronchi contains a small amount of frothy fluid. Bloodvessels normal.

Spleen. Enlarged (13 x 8 x 5 x 6 cm.), soft, capsule smooth. On section, chocolate color; Malpighian bodies swollen, pulp increased, trabeculæ apparently not augmented. In the outer half in the upper quadrant of the organ a large yellow wedge-shaped area of tissue replaces that of the spleen proper (infarct).

Liver. Free from adhesions, softer than normal, and on section cloudy. Gall-bladder normal. Common duct patent.

Kidneys. Similar condition on both sides. Fatty capsule scanty, fibrous. Capsule strips off easily. On section, cortex markings indistinct; glomeruli moderately prominent; medulla and pelvis apparently normal. Both ureters, adrenals, testicles, the aorta, pancreas, œsophagus, stomach, intestines, bladder, larynx, and trachea normal.

The floor of the deep spongy urethra presents a small granulating patch covered with a small amount of pus.

Brain normal. Cord not examined.

Microscopical Examination. The histological study of the various tissues confirmed the gross findings. In the alveoli of the lungs a small number of red cells and a few leucocytes were present as well as a moderate number of desquamated epithelial cells and granular material. The microscopical picture of the spleen was typically that of acute splenic tumor; the infarct presented no noteworthy features. Sections of the spleen and portions of the infarct stained for bacteria with Loeffler's methylene-blue and Sterling's gentian-violet failed to show any micro-organisms. In the kidneys two or three areas of round-cell infiltration were seen in the cortex, otherwise the lesion was merely one of albuminous degeneration.

The affected portion of the urethra showed losses of epithelium, with considerable round and polymorphonuclear-cell infiltration in the tissue underneath. A considerable number of micrococci arranged in pairs, with the characteristic morphology of the gonococcus, were present on the surface and in the inflamed tissue. They decolorized by Gram, and some were noted with an intracellular distribution within polymorphonuclear cells. Other cocci, oval in form and not decolorizing by Gram, were likewise present, having an extracellular position.

Heart. The myocardium showed nothing further. Sections through the affected mitral valve and adhering thrombus present several noteworthy features. The thrombus consists of masses of fibrin, some red

cells, and many leucocytes. Portions of the valvular connective tissue
show small areas of necrosis along the margin, and considerable num-
bers of round cells; here the leucocytic infiltration is very great. Sec-
tions stained by Weigert's modification of Gram's method show no
bacteria. Stained with Sterling's gentian-violet or Loeffler's methylene-
blue a few " biscuit-shaped " cocci, for the most part arranged in
pairs, may be observed occasionally within the polymorphonuclear
leucocytes, more often extracellular.

Bacteriological Report. Tube and plate cultures from the heart's
blood, lungs, spleen, liver, splenic infarct, right kidney, gall-bladder,
urinary bladder, and bone-marrow were made upon solidified blood-
serum (bullock's) and agar-agar.

Particular attention was given to the cultivation of micro-organisms
from the valvular vegetations. After searing the surface of the latter
very thoroughly cultures were made from several places upon agar-
agar, solidified blood-serum, Laitinen's medium,[1] and in a mixture of
ascitic fluid and ordinary peptone agar-agar containing 2 per cent.
glucose. The ascitic fluid and agar-agar were mixed in equal parts.
In this series of cultivations from the heart lesion those upon simple
agar-agar proved negative. In one blood-serum tube two small gray,
discrete, pinpoint-sized colonies were observed at the end of forty-eight
hours. Cover-slips showed them to consist of diplococci, often having
the characteristic " biscuit " morphology. They decolorized by Gram.
Transplantation to ordinary agar-agar gave no results at the end of one
week in the incubator at 37° C.; when transplanted upon Laitinen's
medium, or to the mixture of sugar agar-agar and ascitic fluid, a scanty
growth could be obtained, made up of cocci presenting the same general
morphological and tinctorial character. In three of the plates contain-
ing Laitinen's mixture, growths consisting of six to eleven discrete
white or gray colonies were obtained; the two others were still sterile
at the end of nine days. Of the four plates of the sugar agar-agar and
ascitic fluid mixture one gave one colony and another three colonies.
Both were made up of cocci similar in all respects to those of the other
cultures. Subcultures in peptone bouillon, glycerin broth, gelatin, on
peptone agar-agar, potato, and glucose agar-agar were invariably nega-
tive. (The reaction of these media (potato excepted) was $1.5 +$ to
phenolphthalein.) Transplantations to solidified blood-serum (bullock's)
gave variable results. There were as many failures as positive results.
When successful their growth was very scanty and the viability short.
Cover-slip preparations invariably showed the same moderate sized
coccus, generally with diplo arrangement, and often with the " biscuit "
morphology. They stained readily with gentian-violet, fuchsin, and
Loeffler's methylene-blue; decolorization with Gram was prompt.

Animal Experiments. A suspension of four colonies was made in
5 c.c. of sterilized peptone broth and the whole inoculated intravenously
in equally divided doses into two young rabbits (787 and 910 grammes
respectively).

For two days the animals seemed unusually quiet, but since then no
untoward effects have been observed (over one month of observation).

[1] Taav. Laitinen. Beitrage zur Kenntniss der Biologie des Gonococcus (Neisser), Centralb.
f. Bakt. u. Parasit., 1898, vol. xxiii. p. 874. This consists of cyst or ascitic fluid, and bouillon
containing 1 per cent. peptone and 0.5 per cent. sodium chloride.

Fig. 1.
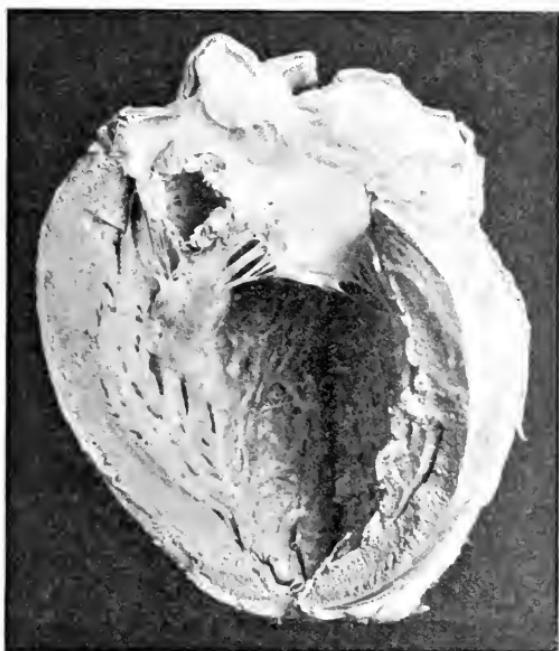
Photograph of the left heart, showing the mitral vegetations. Those on the chordæ
tendinæ do not show in the picture.

Fig. 2.
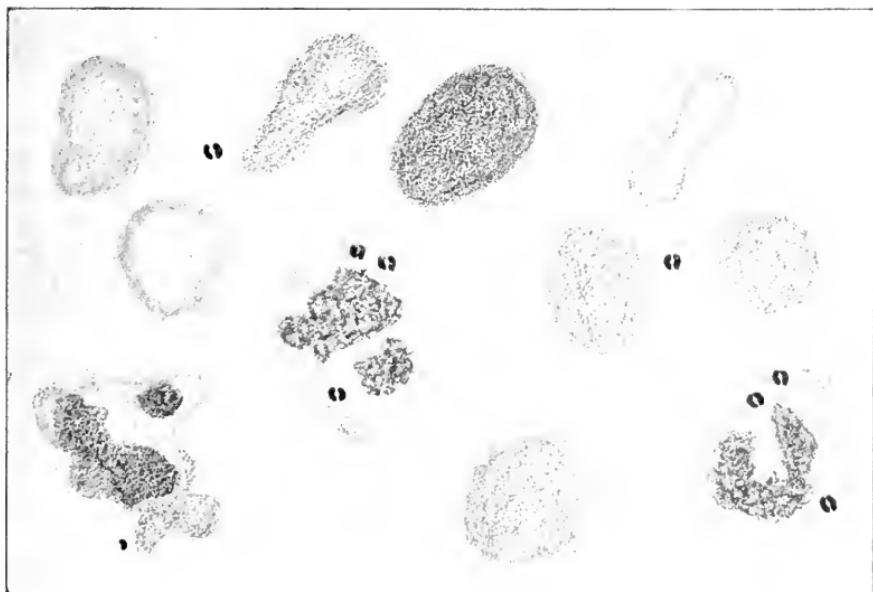
Cover-slip preparation from the vegetation on the valve. Stained with gentian-violet.
Leitz oil immersion 1/12, ocular 5. Enlarged.

Of the remaining cultures—heart's blood, liver, gall-bladder, spleen, splenic infarct, lung, kidney, bone-marrow, and urinary bladder—those from the spleen, lung, splenic infarct, bone-marrow, and kidney remained still sterile at the end of nine days. From the liver, gall-bladder, and urinary bladder a pure culture of a moderately motile, gas-producing bacillus, which produced indol, was obtained. Tinctorially and culturally the organism behaved like the bacillus coli communis.

The cultures from the heart's blood all proved negative except in a single blood-serum tube, in which one small gray colony was observed at the end of forty-eight hours. It consisted of cocci quite similar to those already described in connection with the cultures from the valves. It also decolorized when stained by Gram's method. Transplantation upon simple agar-agar, blood-serum, and the sugar agar-agar and ascitic fluid combination were unsuccessful. The organism was lost, owing to the failure of recultivation.

Summary of Bacterial Findings. Gonococcus in the heart's blood and valvular vegetations ; bacillus coli communis in the liver, gall, and urinary bladders. Remaining organs sterile.

The morphological characters and cultural behavior, taken with the tinctorial reactions of the micro-organism isolated from the blood and valvular vegetations, certainly, are so conclusive that no reasonable contention can possibly arise as to the gonorrhœal nature of the septicæmia and endocardial lesion.

The number of cases in which the evidence of the purely gonococcal nature of the complicating lesion may be considered definitely proven is so few that it seems worth while recapitulating their main features.

The first case really belonging to this group was reported by Thayer and Blumer ;[1] the gonococcus was obtained in pure culture twice during life from the blood, and was found microscopically post-mortem in the affected regions. In the case of Dauber and Borst[2] the gonococcus was obtained from the heart's blood in pure culture. As to the identification of this organism the authors were in doubt, but most observers agree as to their identity with the gonococcus of Neisser. In the third instance, reported by Thayer and Lazear,[3] these observers obtained gonococci in pure culture three times during life from the circulating blood and also from the lesions of the heart and pericardium postmortem. From a fourth case, reported by Rendu and Halle,[4] a pure culture of gonococci was obtained during life from the endometrium and demonstrated in cover-slips of exudate from the elbow-joint. A pure culture was obtained from the heart lesion after death. Still more

[1] Thayer and Blumer. Endocardite Ulcéreuse blennorrhagique. Arch. de Méd. Exp. et d'Anat. Path., 1895, Tome vii. p. 701.

[2] Dauber and Borst. Maligne Endocarditis im Anschluss an Gonorrhoea. Deutsch. Arch. f. klin. Med., 1896, Bd. lvi. p. 231.

[3] Thayer and Lazear. Loc. cit.

[4] Rendu and Halle. Bull. et Mém. Soc. Méd. des hôp. de Paris, 1897, 3 serie, Tome xiv. p. 1325.

conclusive than any is that of Lenhartz,[1] in which he obtained a pure culture of the micrococcus gonorrhœæ from the aortic valve vegetations, and, inoculating some of this into a previously healthy human urethra, incited urethritis with purulent discharge, in which organisms in every way, morphologically and tinctorially, typical of the gonococcus, were demonstrated.   Finally, from my own case—the sixth—I succeeded in demonstrating microscopically the gonococcus in the urethra and valvular vegetations.   I was further able to cultivate this microorganism in pure culture from the blood of the heart and mitral lesion post-mortem.

This complicating endocarditis of gonorrhœa is distinguished by no special anatomical feature from those endocarditides induced by the more common pyogenic bacteria.   For the fifteen most probably purely gonococcal infections of the endocardium, Thayer and Lazear give the following table as to anatomical distribution.   To this we have added our own case and that of Berg's[2]—an aortic lesion :

$$\text{Left heart} \begin{cases} \text{Aortic,} & 8 \\ \text{Mitral,} & 3 \\ \text{Both,} & 2 \end{cases} \qquad \text{Right heart} \begin{cases} \text{Tricuspid,} & 1 \\ \text{Pulmonary,} & 2 \end{cases}$$

13–76.5 per ct.   3–17.6 per ct.

Both sides : all four valves, 1–5.9 per cent.

The symptomatology of gonorrhœal endocarditis is essentially the same as that met with in the other forms of ulcerative lesion.   Complicating arthritis, when present, often precedes the heart affection ; in others, as in the one which I have herein reported, the arthritic trouble may come on after the development of the cardiac lesion.   Pericarditis is rare ; in the case of Thayer and Lazear it was present.   Councilman has reported one case in which myocardial abscess existed without any endocarditis.

CONCLUSIONS.   1. Gonococcal urethritis may be the starting-point for a fatal septicæmia induced by a pure infection with the gonococcus.

2. Endocarditis and arthritis are occasionally complications of such an infectious disease.

3. The endocardial processes may be incited by the gonococcus without the association of other organisms.

[1] Lenhartz.   Ueber acute ulceröse gonorrhoische Endocarditis.   Berl. klin. Woch., 1897, Bd. xxxiv. p. 1138.

[2] Berg.   Pyelonephritis and Ulcerative Endocarditis as a Complicating Factor of Gonorrhœa, Medical Record, 1899, vol. lv. p. 602.

OBSTRUCTIVE BILIARY CIRRHOSIS.

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THE recent occurrence in Montreal of a case of cirrhosis of the liver which seemed to stand in etiological relationship to the pressure on the common bile-duct of an enlarged gland at the hilus of the liver, the autopsy material from this case being studied at the Royal Victoria Hospital, has led to a review of the literature of cirrhosis of the liver, with special reference to the frequency of this variety.

Although it has been recognized for many years that long-continued obstruction of the bile-ducts might cause an increase of the fibrous tissue of the liver, yet obstructive biliary cirrhosis was only established as a distinct pathological condition in 1874 and in 1876 by the labors of J. Wickham Legg, of London, and J. M. Charcot, of Paris. It was due to the observations of these men more than to any other investigations that light was thrown on the confused classification of morbid conditions of the liver, and it is to their great renown that they combined pathological, clinical, and experimental evidence in favor of their views. In vol. ix. of the *St. Bartholomew's Hospital Reports*, published in 1873, there appeared Wickham Legg's first experimental observation in this field, under the title of "On the Changes in the Liver which follow Ligature of the Bile-ducts." Legg tied the common bile-duct, necessarily without antiseptic precautions, in sixteen cats, twelve of which were left for a sufficient time to obtain characteristic changes in the liver. By these experiments he produced a well-marked jaundice, great emaciation, and finally death of the animals on which he had operated, and found at autopsy an enlargement of the liver, a distinct increase of the interlobular connective tissue, and an atrophy of the liver cells.

It may be noted that a similar result had been obtained experimentally by Oscar Wyss in 1866 and by Heinrich Mayer in 1872. Legg's first clinical observations were published in the *Transactions of the Pathological Society of London*, 1874 (vol. xxv., pp. 133 and 155). He here reports two cases. In the first case, an unmarried woman, aged twenty-three years, who during her short life had been highly intemperate, and who had shown for some two weeks before death marked jaundice, at autopsy was found to have a gallstone in the common duct, a dilatation of all the bile passages, and an interlobular cirrhosis of the liver. The second case was that of a man, aged thirty-five years, with a history of strict temperance, who had been jaundiced nine months and had an

outbreak of xanthelasma multiplex on his face.   At post-mortem hydatids of the liver, omentum, and recto-vesico pouch were found, with a resulting compression of the hepatic duct and an increase of the connective tissue about the portal canals.   There was no other evidence of cirrhosis of the liver, and the obstruction of the hepatic duct was not complete.

In 1876, however, Legg published a case of congenital deficiency of the common bile-duct, the cystic and hepatic ducts opening in a blind sac, in which there was a well-marked interlobular and intralobular cirrhosis of the liver.   In the same article he reviews the literature of congenital deficiency of the bile-ducts, and concludes that there is in all cases a cirrhosis of the liver dependent on the diseased condition of the ducts.

In the same year there appeared in the *Archives de Physiologie* Charcot and Gombault's well-known monograph on the diseases of the liver.   These observers adopt an elaborate classification of the cirrhosis of this organ, in which classification, unfortunately, the terms used (annulaire, insular, and monolobulaire) are not always capable of proper interpretation.   They recognize Hanot's cirrhosis, or hypertrophic cirrhosis with jaundice; Laennec's atrophic cirrhosis, and the cirrhosis dependent on obstruction of the biliary passages, the latter being anatomically identical with Hanot's cirrhosis.   In the same monograph are reported four cases of cirrhosis of the liver following obstruction of the bile-ducts, the obstruction being caused by gallstones in the gall-bladder, by gallstones in the ampulla of Vater, cancer of the head of the pancreas, and angiocholitis of the larger bile passages. The anatomical picture of the livers of these cases is the same as that seen in Hanot's cirrhosis.

On the experimental side, Charcot reported observations on seven rabbits, in which he ligated the common bile-duct, producing jaundice and emaciation during life, and finding after death an enlargement of the liver, dilatation of all the bile passages, an interlobular cirrhosis, and many changes in the epithelium of the bile canaliculi.   Charcot naturally operated without strict asepsis, and the presence of many leucocytes and small abscesses in various parts of the liver is a proof that he caused a serious infection of this organ; the question is thus raised whether the fibrous changes he saw in the livers of these rabbits were due simply to the damming back of bile in the dilated ducts, and its subsequent action on the liver cells, or to the growth of microorganisms introduced at operation.

The various clinical and pathological observations on the liver were summed up in 1882 by Mangelsdorff, of Leipzig, who collected all the cases of cirrhosis of the liver which he could find recorded up to the date of publication of his own article.   These cases he presented in

abstract in the *Deutsches Archiv für klinische Medicin*. He reports altogether 321 cases of cirrhosis, and of this total number 184 cases were shown to be due to obstruction of the biliary passages, eliminating, moreover, all of these cases in which a certain or doubtful history of either syphilis or alcoholic intemperance might be supposed to have any decided action on the liver itself. Mangelsdorff concludes that there is no particular variety of cirrhosis which can be said to be dependent upon this disease of the bile passages, but that practically any condition of fibrosis of the liver can follow obstruction of the ducts.

In the literature since Mangelsdorff's compilation of cases—that is, from 1882 to 1900—we have been able to find only twenty-one distinct cases of cirrhosis of the liver due to obstruction of the biliary passages, if we exclude, on the one hand, those cases in which only a partial obstruction was associated with cirrhosis of this organ, and, on the other hand, those cases in which the statements of the writers are somewhat indefinite as to the exact pathological conditions. Thanks to the kindness of Dr. Merrill and Dr. Fletcher, of the Surgeon-General's Library at Washington, who allowed us to use their complete card catalogue, we have been able to bring this historical review up to May 1, 1900, and thus to present a fairly complete list of cases for the past eighteen years. To the twenty-one cases found already reported we may add three cases taken from the records of the Royal Victoria Hospital in Montreal, which show this condition in both the early and the late stages. The following is a list of the cases on record:

CASE I. (Maffucci. *Giornale Internazionale della Scienze Mediche*, 1882, nouva serie, anno 4–2, Napoli, pp. 889–910).—Man; intense jaundice and ascites; liver soft on surface, olive-green, rougous, atrophied; cystic ducts dilated and containing a little liquid like egg albumen; common duct enormously dilated; hepatic duct slightly dilated. Below the common duct a band of connective tissue, which for 0.5 cm. compresses the duct. All lobules of the liver show connective tissue diffused about the parenchyma, which is diminished in volume; connective tissue between acini. Interlobular and intralobular cirrhosis.

CASE II. (same author).—Man; cancer of the pancreas pressing on the common duct; intense jaundice, ascites; liver small, surface soft, green; cystic and common ducts dilated. Head of pancreas transformed to a carcinomatous tissue, which completely occludes the common duct; all bile capillaries dilated. Interlobular and intralobular cirrhosis.

CASE III. (same author).—Woman; intense jaundice, ascites; carcinoma of stomach, with many secondary nodules in the peritoneum, one compressing the common duct at the point of union of cystic and hepatic ducts; hepatic and common ducts dilated; liver olive-green, atrophied, surface smooth, soft; all bile-ducts dilated and containing bile. Interlobular and intralobular cirrhosis of the liver.

CASE IV. (Heneage Gibbs. *Transactions of the Pathological Society of London*, 1883, vol. xxxiv., p. 129).—Male infant; family history

good; born December 3, 1881; average development; jaundiced skin and conjunctiva a few days after birth; persistent clay-colored stools, emaciation, ascites; death July 10, 1882. At post-mortem, liver hard, smooth, weight 4 ounces; no common duct; occlusion of pancreatic duct; hepatic duct filled with fibrous mass; interlobular connective tissue much increased. Both interlobular and intralobular cirrhosis of the liver.

CASE V. (Henry Ashby. *Archives of Pediatrics*, 1884, vol. i., p. 537). —J. H., admitted to the Dispensary for Sick Children at Manchester, October 4, 1883. Family history negative; maternal, syphilis. Jaundice since birth; urine bile stained; stools clay-colored; liver enlarged, edge at umbilicus. Death December 30, 1883, aged four and a half months. At post-mortem all organs bile stained; no ascites; liver seven ounces, not enlarged, dirty-green color, surface granular, tough feel, creaking when cut. On section, dark-green islets of fibrous tissue, especially about the portal vessels. Small cystic duct entering the common duct and pervious to duodenum; no hepatic duct; bile-duct ending in fibrous tissue at the transverse fissure; microscopically fibrous tissue about the portal vessels. Both interlobular and intralobular cirrhosis.

CASE VI. (Alivia. *Contributo alla Casuistica della Cirrhosi Biliare*, Sassari, 1885).—Patient admitted November 13, 1883. Tumor in right hypochondrium, painful, fluctuating in size; pain in right hypochondrium, passing to epigastrium; nausea, vomiting, diarrhœa, jaundice; dark-colored urine; no clay-colored stools; irregular fever; death. At autopsy, perihepatitis, hepatic cirrhosis, biliary calculi, dilatation of bile channels, two gallstones in the gall-bladder.

CASE VII. (Michael. *Archives of Pediatrics*, 1885, S. 573; also *Archiv für Kinderheilkunde*, vii., 2, S. 137. Quoted by Gese).—Boy; jaundice since birth; clay-colored stools; dark-colored urine; great emaciation; death, second month. Liver not enlarged, green, creaks on cutting, strands of fibrous tissue through it; larger bile channels filled with bile; common duct ends in fibrous tissue.

CASE VIII. (Gessner. *Ueber Cong. Verschluss der Gallenausfuhrungsgange*, Halle, 1886. Quoted by Gese).—Boy; jaundice since birth; urine contains bile; feces colored; vomiting, cough, emaciation. Death, third month. Liver enlarged, grayish-green, hard, surface granular; connective tissue increased; cystic, hepatic, and common ducts obliterated except for pinpoint lumen in the common duct.

CASE IX. (Legry. *Bulletin de la Société Anatomique de Paris*, 1889, Anne 64).—E C., female, May 9, 1889; aged fifty-seven years. At twenty years, in the sixth confinement, jaundice, pain in right hypochondrium and epigastrium; no clay-colored stools; chronic jaundice, œdema, and ascites; collateral circulation developed; urine quite dark. Post-mortem May 22d. Liver enlarged, surface granular, very hard, cuts with difficulty; bile channels dilated, contain biliary concretions; glands generally enlarged. An interlobular and an intralobular cirrhosis.

CASE X. (Cnopf. *Münchener medicinische Wochenschrift*, 1891, Nos. 16 and 17. Quoted by Gese).—Child; jaundice second day; white stools; urine containing bile-pigment. Death, tenth week. Liver normal in size, smooth surface; jaundiced interacinous and intraacinous tissue increased; gall-bladder and duct quite lacking.

CASE XI. (Cnopf. *Münchener medicinische Wochenschrift*, 1891, Nos.

16 and 17.   Quoted by Gese).—Child ; three days jaundiced ; urine icteric ; grayish yellow, thin stools ; emaciation ; ecchymoses on face and neck ; liver enlarged, sensitive ; bloody diarrhœa.   Death, thirty-third week.   Liver enlarged, cirrhotic.

CASE XII.   (Rolleston and Kanthack.[1] *Archiv für klinische Medicin,* 1892, p. 488).—Child, one month old ; jaundiced ; cystic disease of liver and kidney, with hypertrophic ciliary cirrhosis ; bile passages much dilated, connective tissue about them much increased ; great increase of bile-ducts ; vacuolization of liver cells.   Cirrhosis of liver ; no definite obstruction of ducts.

CASE XIII.   (Parkes Weber. *British Medical Journal,* April 25, 1895, p. 1027).—Mrs. M. S., aged fifty-five years ; jaundice four years ; pain in left side ; no hepatic colic, no children, no miscarriages, no syphilis, no alcohol (?) ; xanthelasma palpebrarum.   Liver hard, uniformly enlarged ; œdema of feet and ankles ; dulness of liver from fifth rib to level of umbilicus ; pruritus ; later, ascites ; liver not to be felt ; stools colorless or mixed with blood ; urine contains bile ; no dilatation of abdominal veins ; temperature 100° F.   Coma and death, December 24, 1895.   At post-mortem, liver 54 ounces, tough, surface puckered or granular, green ; gall-bladder dilated, hypertrophied, contains green fluid ; cystic and hepatic ducts pervious, common duct dilated ; two black gallstones in ampulla of Vater, size of cherry-stones ; no ulceration ; contents of gall-bladder could be squeezed into the duodenum.

Microscopical Examination.   Multilobular cirrhosis ; no multiplication of smaller bile-ducts (liver presents ordinary cirrhosis, type of hypertrophic cirrhosis due to gallstones).   Author compares Charcot's case, *Archives de Physiologie,* second series, vol. iii., p. 295.

CASE XIV.   (Chadwick. *British Medical Journal,* 1895, vol. i., p. 1143).—Woman, aged thirty-six years ; copious hæmatemesis ; jaundice and gallstones six years ; atrophy of liver ; xanthelasma ; liver green, much cirrhosed, fibrous tissue like ordinry cirrhosis.

CASE XV.   (Gese. *Jahrbuch fur Kinderheilkunde und physiche Erziehung,* N. F., 1896).—Twenty-five cases of occlusion of the bile-ducts, with a number of cases of cirrhosis of the liver.

One new case reported : Child ; jaundiced eighth and ninth day ; clay-colored stools ; urine containing bile-pigment ; liver enlarged. At autopsy, obliteration of hepatic duct ; patent common duct ; open gall-bladder, fluid from gall-bladder passing into duodenum ; liver cirrhotic ; cirrhosis irregular, both interlobular and intralobular in type.

CASE XVI.   (Stevens. *Archives of Pediatrics,* 1896, vol. xiii., p. 733). —Wm. McA., aged four months ; family history negative ; jaundice at birth ; stools clay-colored ; urine clear, green ; later, blood in vomitus and stools, which became black and tarry.   Death from hemorrhage. At autopsy, absence or obliteration of hepatic and cystic ducts ; cirrhosis of liver ; hemorrhage into stomach and intestines ; deep jaundice ; cystic, hepatic, and common ducts transformed to fibrous cords,

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[1] In the above case of Rolleston and Kanthack no definite obstruction of the bile passages could be detected. Nevertheless, the dilatation of the biliary channels was so marked and the type of cirrhosis was so similar to that seen in the cases in which a positive obstruction could be demonstrated, as was shown by the illustration in their paper, as to make it quite proper to include their case in this list of cases of true obstructive cirrhosis.

absolutely impervious. Liver large, dark green on section, marbled, free surface granular.

Histological Examination. Cirrhosis of liver, involving groups of lobules (multilobular, possibly interlobular). Bile-ducts much increased.

CASE XVII. (Kynoch. *Edinburgh Medical Journal*, 1896, vol. xvii., pp. 35–37).—Matilda C., aged three months and four days, admitted to Dundee Royal Infirmary at two and a half months; jaundice since birth; skin and conjunctiva green color; emaciation; abdomen distended; liver enlarged, edge sharp; no ascites. At post-mortem, liver 237 grammes (8 ounces), edges sharp, green, tough in consistence, surface irregular, fibrous bands of yellow color; common duct, at junction of cystic and hepatic ducts, narrow, thread-like, just pervious to bile. Microscopically, slight biliary cirrhosis.

CASE XVIII. (Krokiewiez. *Wiener klinische Wochenschrift*, 1898, pp. 321–323).—M. S., aged fifty-seven years; jaundice; anorexia; constipation; pain in abdomen one year; chills at onset; œdema of legs, emaciation, and ascites; liver enlarged, painful, border 12 cm. below right costal margin, edge hard and thick, surface smooth; urine bile stained; tumor in region of gall-bladder; jaundice one year; ascites. Coma and death, August 14, 1897. At post-mortem, dilatation of common, hepatic, and cystic ducts; stenosis of common duct. Liver 3 cm. below costal margin, surface smooth, edge broad, capsule thickened, parenchyma hard, greenish-brown; bile-ducts dilated; gall-bladder enlarged, wall thick, contains few gallstones. Interlobular cirrhosis of liver; stenosis of common duct.

CASE XIX. (Boinet. *Archives Générale de Médecine*, 1898, vol. i., p. 385).—W., aged thirty-five years; alcoholic, non-syphilitic; gastrointestinal catarrh and dysentery. First seen in 1894; jaundice six years; xanthelasma palpebrarum on both sides; urine high-colored; stools not clay-colored; for two and a half years liver constantly increased in size, reaching from the fifth intercostal space to within 4 cm. of crest of ilium; no ascites; no dilatation of abdominal veins. In 1896, extreme emaciation. Death from tuberculosis. At post-mortem, liver large, smooth, 4720 grammes (not hobnailed); lymphatic glands all enlarged, especially about hilus of liver, where they press on the common duct; liver cirrhotic.

CASE XX. (Rabé. *Cirrhose Periportal avec Calcul Enclave dans l'Ampoule de Vater. Mort par Pylephlebite Obliterante*, February, 1898).—Man, aged seventy-three years. Symptoms of atrophic cirrhosis and ascites. Liver 7 cm. in mammary line; contracted; dilated abdominal veins, jaundice of skin and conjunctiva; urine deep yellow; emaciation, œdema of legs and scrotum, constipation, anorexia; stools normal. Death from marasmus after five months. At post-mortem, 1200 c.c. of abdominal fluid; liver, type of Laennec's cirrhosis, very hard, chamois-gray, surface granular; hepatic, cystic, and common ducts dilated; calculus in common duct, another in ampulla of Vater. Periportal and interlobular cirrhosis, with great increase of bile-ducts.

CASE XXI. (Benner. *Ein Fall von Gallenstauung-cirrhose der Leber nach primaren Adenocarcinom im Ductus Choledochus*. Inaugural Dissertation, 1899).—Post-mortem, typical cirrhosis of the liver. Dilatation of bile-ducts: adenocarcinoma of common duct; retention of bile in duct. Interlobular cirrhosis about ducts; jaundice of all organs; great dila-

tation of all small bile-ducts.   Liver enlarged and cirrhotic, weighing 2210 grammes.

CASE XXII. (hitherto unreported).—Private case occurring in the practice of Dr. D. J. Evans, of Montreal.   Male child, born of healthy parents, November 29, 1897.   Breast-fed ; digestion always bad ; stools greenish ; eczema capitis at three months of age.   One month later, tuberculous glands of neck, caseous and suppurating.   At a year and a half child became fretful and irritable ; urine high colored ; stools green ; abdomen somewhat increased in size.   One month later jaundice of conjunctivæ, clay-colored stools, great enlargement of abdomen, hypertrophy of liver. edge at crest of ilium ; enlargement of spleen ; later, contraction of liver, surface rough and lobulated.   Development of œdema of extremities ; congestion of abdominal veins, ascites, wasting, and emaciation ; skin lemon-yellow in color ; many petechiæ over palms, neck, and chest.   Abdomen tapped and 24 ounces of clear, yellowish fluid removed.   Collection of ascitic fluid almost immediately ; emaciation and wasting extreme ; great cachexia.   Death, July 14, 1899.

The autopsy was performed by Dr. Anderson, of Montreal, examination of abdominal organs only permitted.   Deep jaundice of skin and conjunctivæ, numerous petechiæ of skin of abdomen ; large amount of ascitic fluid ; pale yellow in color.   Great hypertrophy of spleen ; enlarged inflammatory gland at hilus of the liver pressing on the common duct, completely obliterating its orifice ; liver greatly enlarged, surface made up of large lobules of liver substance lying between dense, firm bands of connective tissue, surface very rough.   On section, liver cuts with difficulty, showing a great increase of fibrous tissue, which lies in islands between the hepatic lobules.   Interlobular and intralobular cirrhosis of the liver.

Microscopical Examination of Liver.   The capsule is thickened, with some infiltration of small round cells.   Just underneath the capsule is a layer of fibroblasts, the protoplasm of which stains lightly with eosin, and the spindle-shaped nuclei stain deeply with hæmatoxylin. From the capsule the connective tissue has extended throughout the whole organ, lying in broad bands between the hepatic lobules, which are thus marked off into smaller or larger areas of normal liver substance.   The strands of new tissue are made up of well-developed fibres and young fibroblasts.   At the periphery of the organ bands of tissue join the capsule almost at right angles, and there spreading out into broad bundles round off or top off the hepatic lobules.

In the portal spaces the fibrous tissue has developed concentrically about the bloodvessels and bile-ducts, which are considerably dilated. Close to the vessels the tissue forms a ring of well-developed, rather lightly staining, fibrous tissue, in the periphery of which, where the process is less advanced, may be seen a layer of fibroblasts.   These fibroblasts are especially abundant, extending everywhere, from the older deposit of fibrous tissue into the liver lobules, isolating and surrounding groups of liver cells.   At times these fibres spread out between the hepatic elements, giving an appearance much like the branching of a tree.   Throughout all the lobules, moreover, between the individual liver cells, may be seen isolated fibres of connective tissue—the cirrhosis is thus both *interlobular* and *intralobular* in type.

Coincidently with the deposit of fibrous tissue definite changes have occurred in the liver cells ; near the centres of the lobules the cells are

normal in size, the protoplasm is well preserved, and the nuclei are lightly stained with hæmatoxylin. At the periphery the cells are atrophied and compressed by the fibrous tissue, the protoplasm has almost entirely disappeared, and the nuclei are greatly shrunken. The liver cells thus are in a state of chronic inflammation, or, more properly, have degenerated to their earlier epithelial type. Where the layer of fibroblasts is especially abundant the liver cells are still more atrophied, there remaining practically only the nuclei, which are lined up in tubules or cords and surrounded by the new tissue. These nuclei are somewhat compressed and stained a little more deeply than the normal nucleus of the liver cell. These *cords* or *tubules* of cells, formed of little more than nuclei, are the elements which have been called *bile-ducts*, *bile capillaries*, or more recently *intermediate* or *pseudo-bile-ducts*.

The source of origin of these reduplicated bile-ducts has been in doubt for some years. It is maintained, on the one hand, that these ducts originate from the reduplicated epithelium of the older bile-ducts, while, on the other hand, their origin from compressed atrophied liver cells has been especially emphasized within the past decade. Findlay, who uses the term *intermediate* or *pseudoducts*, considers that they are simply liver cells which have degenerated and assumed the character of primitive hepatic elements, and later come to be connected with the normal bile-ducts. In the present case the origin of these reduplicated bile-ducts from liver cells is readily seen. It is possible to trace all the stages from the normal liver cells to the chronically inflamed liver cells with deficient protoplasm, and then to the rows of liver nuclei lined up in cords or tubules between the layers of fibrous tissue, and presenting an appearance quite similar to that of normal bile-ducts.

This reduplication of bile-ducts has reached an extreme grade in this case; they are especially abundant at the edge of the lobule in the zone of fibroblasts, where the new tissue seems to be surrounded by a wreath of ducts, outside of which lies the normal hepatic parenchyma. This wreath-like arrangement is observable in all the portal spaces; it seems more marked in this disease than in any other pathological conditions of the liver, and may possibly form a histological feature characteristic of obstructive cirrhosis and differentiating it from other varieties of cirrhosis of this organ. (See Fig. 1.)

The strands of new tissue are infiltrated with small round cells, this infiltration being especially rich in the layer of fibroblasts, where the wreath of bile-ducts is to be made out. There are many small round cells as well scattered irregularly through all the new fibrous tissue and deposited between the liver cells in the centres of the lobules; in some areas the strands of new tissue are so infiltrated with small round cells as to suggest an inflammatory origin for the fibrous tissue present.

The walls of the larger bloodvessels are thickened and their lumen filled with blood cells. The smaller bloodvessels are occasionally dilated and in a state of acute inflammation, about the vessel wall being seen a deposit of round cells, with a few connective tissue nuclei. The central veins of the lobules are everywhere dilated; the lobules themselves are congested, often the red blood-corpuscles being massed together in large numbers between the hepatic elements.

The bile channels are dilated and full of brownish-black bile pigment, which is deposited irregularly throughout the bile passages of the whole organ. As a rule, this deposit of bile is most marked about the centres

of the lobules, where often the liver cells are themselves stained yellow with the liver secretion. A similar precipitate of bile-pigment may be observed in the portal spaces and at the edges of the lobules.

Aside from the precipitate of bile-pigment, in many areas of this liver may be seen fine, black granules, coccoid or diplococcoid in shape, which are deposited both intracellularly and extracellularly. The interpretation of the nature of these bodies is exceedingly difficult unless one considers that they are micro-organisms in the progress of disintegration. This view is strengthened by the appearance of the bile-ducts in this case, which are in a state of active inflammation, their lumen being filled with well-formed bacilli. An etiological relationship between these granules and the new tissue developed in this liver was suggested by this appearance, but such a relationship was not confirmed by the examination of later cases of obstructive cirrhosis.

FIG. 1.
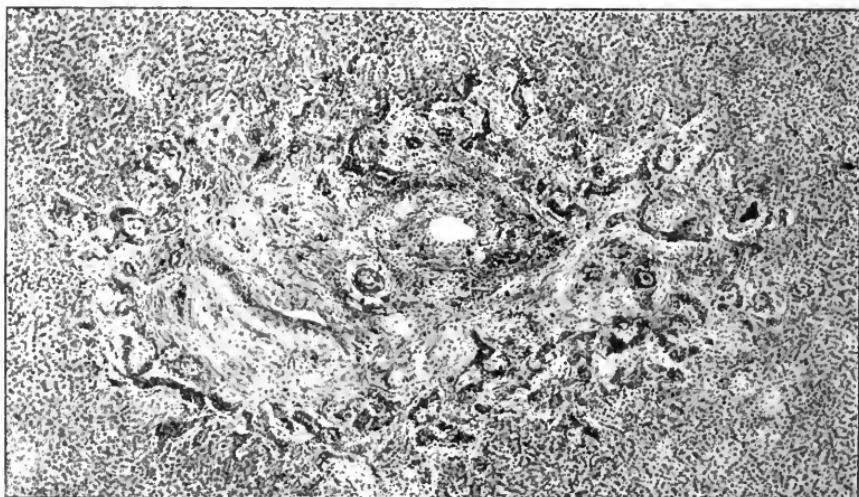
Specimen hardened in Müller's fluid, embedded and sectioned in paraffin stained with hæmatoxylin and eosin. Magnification 105 diameters. Between the hepatic lobules surrounding the portal vessels is seen the new-formed fibrous tissue in concentric rings, at the periphery of which lies the wreath of reduplicated bile-ducts. Slight infiltration with leucocytes. Brownish deposit of bile pigment in the liver parenchyma. Interlobular and intralobular cirrhosis.

CASE XXIII. (hitherto unreported).—Maud V., aged twenty-eight years, admitted to the Royal Victoria Hospital, November 25, 1898 ; died December 22, 1898.

History. Jaundice three years, increasing in intensity; pruritus of skin; clay-colored stools; tenderness in right hypochondrium; anorexia; vomiting, vomitus greenish in color; œdema of the legs; dilated abdominal superficial veins; ascites; hydrothorax; coma and death.

At post-mortem, liver greatly enlarged, weighing over 4000 grammes, surface granular; liver firm, on section cutting like leather; gall-bladder thickened; cystic duct obliterated; hepatic duct slightly dilated, containing a loose calculus pressing on the cystic duct at its orifice. Interlobular and intralobular cirrhosis of the liver.

Microscopical Examination. The morbid changes seen in this liver are quite similar to those seen in the preceding case, but somewhat less advanced in their development. Between the hepatic lobules there are broad bands of tissue, made up of well-developed connective tissue fibres, in the periphery of which are many fibroblasts which penetrate the lobules between the liver cells, isolating and surrounding individual groups of cells. The cirrhosis is both interlobular and intralobular in character.

In the portal spaces where the tissue has developed in concentric rings about the bloodvessels and the bile channels one sees a zone of lightly staining, well-formed fibrous tissue, surrounded by a layer of fibroblasts, in the periphery of which lies a wreath of reduplicated bile-ducts. Outside this wreath lies the normal hepatic parenchyma. This wreath-like arrangement is visible in this liver in many of the portal spaces, but more frequently between the hepatic lobules the bile-ducts are lined up at right angles to the strands of fibrous tissue. (See Fig. 2.)

FIG. 2.
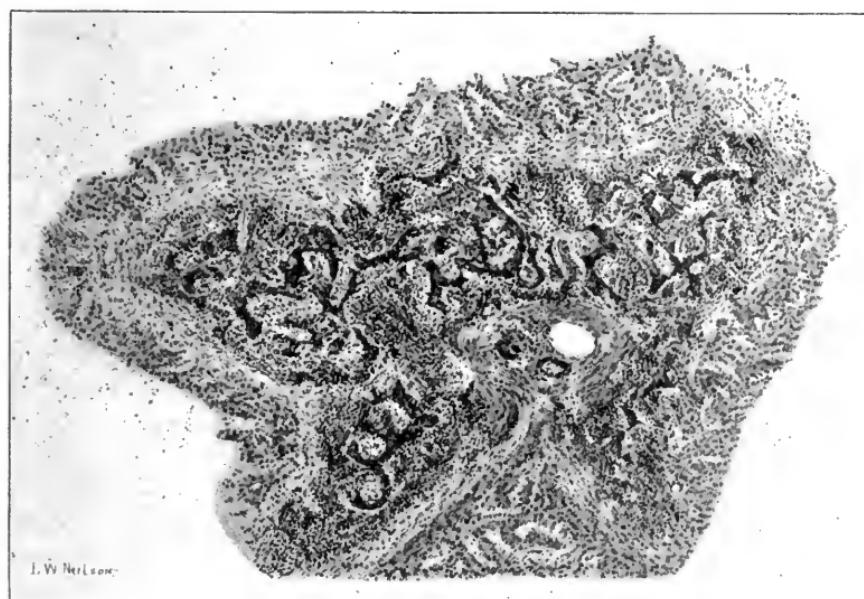
Specimen hardened in Müller's fluid, embedded and sectioned in paraffin stained with hæmatoxylin and eosin. Magnification 70 diameters. Moderate development of fibrous tissue between and within the lobules. Considerable infiltration with leucocytes. Wreath-like arrangement of reduplicated bile-ducts. Interlobular and intralobular cirrhosis.

In the centres of the lobules the liver cells are still preserved, but at the edges of the lobules they are atrophied and compressed. One sees the same transition from the normal liver cells to the chronically inflamed liver cells and thence to the reduplicated bile-ducts; there is no vacuolization and no fatty degeneration of the liver cells.

The walls of the larger bloodvessels are slightly thickened, the smaller bloodvessels being somewhat dilated; the central veins are especially enlarged and the liver lobules are markedly congested throughout,

many red blood-corpuscles lying free among the hepatic elements. The escape of blood in some cases has been so marked as to suggest capillary hemorrhages.

The bile channels are not dilated; there is no special deposit of bile pigment, and only a few liver cells are seen which are slightly stained with bile.

The infiltration with leucocytes is very marked, especially in some of the strands of new tissue, where the deposit of both polymorphonuclear and small mononuclear leucocytes is so extensive as to again suggest an inflammatory origin for the tissue changes. This infiltration, moreover, is especially abundant about the new bile-ducts, but in the lobules themselves, between the liver cells, are often found many isolated small round cells.

The characteristic appearances of biliary cirrhosis are thus seen in this case as well as in the preceding one, and while the presence of leucocytes is strongly suggestive of inflammation, yet there are no bacteria present in any of the bile-ducts and no especial deposit of coccoid or diplococcoid bodies in or between the liver cells.

CASE XXIV. (hitherto unreported).—Walter B., aged fifty-three years, admitted to the Royal Victoria Hospital, November 14, 1899; died November 19, 1899.

History. Attacks of pain in the epigastrium, tenderness, and vomiting, over a period of two years; jaundice; clay-colored stools; bile-stained urine; enlargement of liver and tenderness over gall-bladder; marked itching of skin. Operation: cholecysduodenostomy. Death from hemorrhage.

At post-mortem, liver yellow, granular, firm, and enlarged, on section cutting with difficulty, showing islands of fibrous tissue; cystic, hepatic, and common ducts greatly dilated; ulceration about the ampulla of Vater, especially on the duodenal side, where there is a slight tear in the mucous membrane and an ulcer about the bile papilla, showing recent passage of gallstone; no calculus found at operation or at autopsy. Interlobular cirrhosis of the liver.

Microscopical Examination. (See Fig. 3.) The histological changes seen in this liver are indicative of an early stage of cirrhosis, dependent upon obstruction of the bile passages. The development of fibrous tissue is little marked, but between the lobules may be seen a number of strands of thickened connective tissue. This tissue has not encroached to any extent on the liver cells, and there seems to be comparatively little development of fibrous tissue in the lobules themselves. The tissue itself is largely made up of fibroblasts, with spindle-shaped nuclei. This tissue is specially well developed about the portal spaces, where it is very rich in nuclei. In a few of the portal spaces a concentric arrangement of this tissue about the portal vessels and the dilated bile-ducts may be observed, and a similar zone of fibroblasts, with a wreath of reduplicated "bile-ducts," is seen about the older fibrous tissue. The number of these bile-ducts is quite small, however, and the wreath-like arrangement is only observable in a few areas. The infiltration with leucocytes is especially great in the strands of new tissue; in many of the liver lobules there is a rich deposit of leucocytes among the liver cells, especially at the edge of the lobules.

The bloodvessels are everywhere dilated, both in the portal spaces and in the centres of the lobules. The walls of these vessels are con-

siderably thickened and their lumen filled with red blood-cells. About the central veins there is a rich deposit of fibrous tissue infiltrated with mononuclear leucocytes; here the liver cells are greatly atrophied and have in many cases quite disappeared. In the periphery of the lobule as well the liver cells are shrunken and chronically inflamed.

Fig. 3.
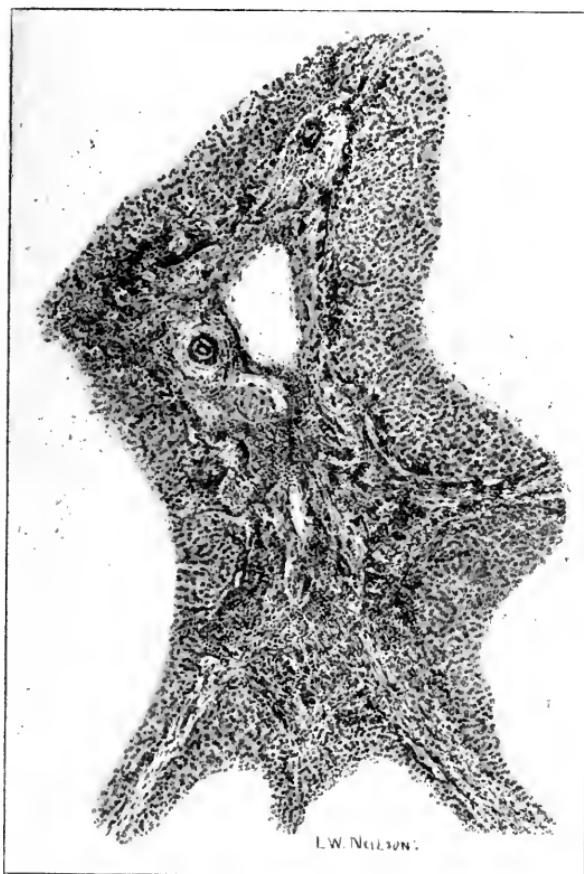
L.W. Neilson.

Specimen hardened in Müller's fluid, embedded and sectioned in paraffin stained with hæmatoxylin and eosin. Magnification 70 diameters. Deposit of fibrous tissue between the liver lobules. Marked infiltration, with leucocytes. Moderate reduplication of bile-ducts, which show the wreath-like distribution. Interlobular cirrhosis.

The bile-ducts are everywhere dilated and full of bile. A deposit of bile-pigment has taken place in many of the liver cells about the central veins of the lobule, where often these cells are stained yellow with this pigment. A radial distribution may often be made out about the dilated central veins.

The microscopical changes in this case reveal a cirrhosis of the liver, interlobular in character, the fibrous tissue having developed about dilated bile channels. The dilatation of these channels and the deposit of bile-pigment is so great as to indicate a long-continued obstruction to the flow of bile, such an obstruction evidently being the etiological factor concerned in causing the cirrhosis.

Analysis of the Above Cases.

CAUSES OF OBSTRUCTION. *Congenital Deficiency of Bile-ducts.* The most frequent cause of complete obstruction to the flow of bile is the congenital deficiency of the hepatic and cystic ducts, these ducts terminating in blind, impervious cords. The livers of these congenital cases are enormously enlarged, the edge often reaching to the anterior-superior iliac spine, the enlargement either being observed at birth or taking place within a few weeks after the entrance into life. The children subject to this disease develop deep jaundice, profound cachexia, emaciation, ascites, œdema of the extremities, and various cutaneous disorders. They usually die at the age of six or eight weeks.

At autopsy the livers are found to be greatly enlarged, with a rough, hard surface. On section they cut with difficulty, show dilated bile channels full of bile and islands of connective tissue. Microscopical examination reveals an interlobular cirrhosis of the liver of an extreme grade, with great reduplication of the smaller bile-ducts. Death intervenes in these cases within a few weeks after birth, and in spite of the extreme and persistent jaundice which one observes a suspicion arises that the retention of bile is not the cause of the cirrhosis of the liver, but that the increase of the fibrous tissue in this organ is the result of the same intra-uterine morbid change which leads to the obliteration of the ducts. It must be remembered, however, that the liver is probably an active functional gland after the third month of pregnancy, and we thus have a lapse of time sufficient for the cirrhosis to develop in consequence of the obliteration of the ducts alone and the subsequent damming back of bile and its action on the liver cells without calling to our aid in explaining this condition any unknown etiological factors.

Gallstones. Gallstones stand next in order of frequency to the cases of congenital deficiency of the ducts. Here a complete obstruction to the flow of bile may be caused by the filling of the gall-bladder by a number of stones, by the lodgement of a single stone in one of the ducts or in the ampulla of Vater, or, more frequently still, by the contraction of scar-tissue which has developed about an ulceration caused by the passage of a sharp-edged gallstone. In some one of these ways the flow of the liver secretion is entirely shut off, and at autopsy the livers of these patients show a cirrhosis interlobular in character and usually moderate in extent. If the obstruction be of long standing a more advanced state of cirrhosis may be developed, the fibrous tissue developing both between and in the hepatic lobules.

It has been stated by some writers that in gallstones cirrhosis of the liver seems to develop more frequently in connection with rough, sharp-edged stones than in connection with round, smooth stones, which are less capable of causing inflammation and ulceration of the biliary passages.

Cancer of the Head of the Pancreas occurs rarely as a cause of obstructive biliary cirrhosis. Several cases have been reported, however, of this variety, either by Mangelsdorff or in the list of cases quoted in this article. The growth of cancerous tissue in the pancreas completely obliterates the lumen of the common duct, and thus causes a complete obstruction to the flow of bile, inaugurating the same series of morbid changes in the liver as is seen in the other cases.

Enlarged Glands at the hilus of the liver exerting a pressure on the common or the hepatic duct in rare instances may block the liver secretion sufficiently to cause cirrhosis of this organ. This is the condition seen in one of the cases studied at the Royal Victoria Hospital. The glands may be cancerous, tuberculous, or simply inflammatory in nature, and the livers of these cases may show both the presence of metastatic tumor nodules and an increase of the fibrous tissue about the dilated bile channels between the lobules of hepatic cells.

MACROSCOPICAL APPEARANCE. The livers in these cases of obstructive cirrhosis are greatly enlarged, with a rough, jaundiced surface, and considerable perihepatitis. The weight of the liver is much increased, the organ hard, cutting with great difficulty, and showing on section greatly dilated biliary passages and islands of new connective tissue.

In the later stages the contraction to which all cirrhotic livers are probably liable takes place in this variety of cirrhosis in a large proportion of cases, and, in fact, these livers often approach more nearly the type of cirrhosis seen in the atrophic liver of Laennec than they do the enlarged hypertrophic organ of Hanot. The development of ascites, œdema of the extremities, and the caput medusæ of abdominal veins in many cases indicates the great obstruction to the flow of blood in the portal bloodvessels caused by the large amount of fibrous tissue present in the liver.

MICROSCOPICAL EXAMINATION. Careful histological study reveals dilated bile channels, dilated bloodvessels, an increase of fibrous tissue about these dilated channels, and a cirrhosis of the liver which may be either interlobular, intralobular, or pericellular in type. As has already been indicated, groups of cells or individual cells are often seen isolated and surrounded by fibrous tissue. The presence of new bile-ducts is noted in nearly every careful anatomical description, although the wreath-like distribution of bile-ducts has not been emphasized in any cases except those studied in Montreal. It is impossible as yet to say whether this wreath-like distribution is peculiar to this variety of hepatic cirrhosis, but its occurrence in all three of the cases here reported leads to the suggestion that it may be characteristic of this disease, differentiating it histologically from other morbid conditions of the liver.

I use the term bile-ducts here to indicate those smaller bile channels lined by cubical epithelium as distinct from bile capillaries lying between the liver cells and lined by flat epithelium. The presence of these reduplicated bile-ducts cannot be considered diagnostic of any variety of cirrhosis of the liver, as they have been described in practically all varieties of this disease, in hydatids of the liver, and in certain intoxications. Wagner and Liebermeister have noted them in cases of gallstones, in alcoholic cirrhosis, and in chronic obstruction of the hepatic veins; they have been described in liver abscesses, in the syphilitic liver of Friedländer, and in chronic tuberculous peritonitis. Podwyssozki has observed them in regenerating liver tissue, and it has recently been shown by Neisser, of Leipzig, that the experimental injection of phenol solution and substances like phosphorus into the circulation is followed by the appearance in the liver of these new-formed bile-ducts.

Ackermann has shown by injection that these columns or tubules of cells described under the name of ducts are in reality bile channels, for he has been able to trace a direct connection between them and the larger bile passages.

Recently, Findlay has called renewed attention to the mode of formation of these new bile-ducts, regarding them as simply liver cells, degenerating and reverting to their embryonal or epithelial type and later coming to be connected with the older bile passages. He proposes to name them *intermediate* or *pseudo-bile-ducts*. Although their origin from chronically inflamed liver cells has been specially emphasized within recent years, and although this mode of origin is quite clearly indicated in the cases studied in this report, it must be remembered that there are many pathologists who still maintain that these new ducts are formed by the simple reduplication of the epithelium of the older bile-ducts.

CLINICAL SYMPTOMS. In studying the histories of these cases of obstructive cirrhosis one is impressed by the great similarity which the symptoms of the different patients bear to each other, such a similarity being so marked as to reveal a symptom-complex and a cycle of clinical changes which are quite characteristic of a complete obstruction to the flow of bile and the morbid changes subsequent to this obstruction. The history of any one case, in fact, is repeated in the histories of practically all of the other cases.

The onset of the disease is sudden, the first symptom being an extreme jaundice, coincident with which is the appearance of clay-colored stools, which indicate the complete stoppage to the flow of bile and the retention in the blood and lymph of the patient of this liver secretion. Enlargement of the liver follows immediately, often reaching an extreme grade, the edge being found at the anterior iliac spine. The systemic disturbance now becomes marked, due doubtless to the incom-

petence of the liver and absorption of the liver secretion. The head-ache is painful and severe, often intermittent in occurrence ; the ano-rexia is complete, so that the patient may be able to take no food what-ever, the vomiting being frequent and exhausting, the ejecta a greenish detritus or bile-stained gastric secretion. With the appearance of the gastro-intestinal changes the various forms of cutaneous disorders de-velop, especially xanthelasma and subcutaneous hemorrhages. The itching of the skin is extreme, so great as to require large doses of morphine as a sedative. Fever is rare, and in fact does not occur in the cases of persistent obstruction to the flow of bile, it usually being seen in allied cases of an intermittent obstruction caused by the lodge-ment of a calculus in the ampulla of Vater, when usually paroxysms of chills, fever, and sweating develop, followed by partial relief of the jaundice. The emaciation and wasting are very rapid, the loss of strength and flesh taking place within a few weeks after the onset of the first symptoms.

The condition in which these various symptoms are included has been described as cholæmia, but a better definition is found in its description as *hepatic incompetence* and *auto-intoxication*. As a result of the complete stoppage to the flow of bile and the retention of this substance by the system, the liver is permanently put out of function, the retained products of digestion, instead of being further broken up and elimi-nated, are, together with the liver secretion, absorbed by the general circulation, and act through the blood and lymph on all the different organs and tissues of the body.

Following the enlargement of the liver we have a subsequent contrac-tion of this organ, which occurs with great rapidity, and the appearance of which ushers in the chain of symptoms which quickly results in death. The size of the liver greatly diminishes, the fibrous tissue developing in it blocks the portal circulation and causes the dilatation of the abdom-inal veins (during the establishment of a compensatory circulation), œdema of the extremities, and abdominal ascites. The occurrence of the last three symptoms is common to practically all of these cases of obstructive cirrhosis, and, as we shall point out below, they are symp-toms differentiating this variety of disease from the ordinary cirrhosis of the liver in which jaundice is present.

The patients subject to this disease suffer from the greatest weakness and emaciation, unable to retain food in consequence of the persistent vomiting, developing marked cutaneous disorders, and in the late stages œdema and ascites, quickly sink into a profound coma or a toxic con-dition, the end of which is seen only at the fatal exit.[1]

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[1] It is difficult to explain the statements of several writers who allude in their description to clay-colored stools and bile-stained vomitus : the presence of bile in the gastric secretion may be accounted for, if we assume a secretion of this substance by the walls of the stomach, as

GENERAL CONSIDERATIONS.   In considering these cases of cirrhosis of the liver associated with complete obstruction of some one of the ducts of this organ and subsequent damming back of bile on the liver cells several problems naturally present themselves :

Can obstruction to the flow of bile cause in man and animals a cirrhosis of the liver, and by what means is such a cirrhosis caused ?

Is the type of cirrhosis associated with obstructions in man to be differentiated on pathological and clinical grounds from other varieties of cirrhosis of this organ ?

Let us now consider those questions in their various aspects.

As we have indicated above, many experiments have been performed which seem to show that cirrhosis of the liver is in *animals* a direct consequence of ligature of the common bile-duct or its branches.   In the earlier experiments, however, although the increase of fibrous tissue was always found to follow this ligature of the ducts, yet the operators conducted their experiments without modern methods, and in many cases infected their animals at the time of operation.   It is noticeable in nearly every series of cases reported that a large proportion of animals died from sepsis, and it thus was impossible to decide whether the cirrhosis seen was a consequence of the damming back of bile caused by the ligature of the ducts or followed the infection of the liver and the bile passages by micro-organisms introduced at operation.

Beside the work of Legg and Charcot, already referred to, a number of pathologists have worked in this field at different periods.

Maffucci, of Naples, reported a series of experiments in which he ligated the common duct in a number of animals which lived about one month and showed at autopsy a typical interlobular cirrhosis.

Julius Steinhaus, who operated on guinea-pigs, found after ten days dilated bile-ducts and necrotic areas in the liver cells, but found no increase of bile-ducts and no increase of connective tissue in the liver. A lapse of ten days between the operation and autopsy cannot be considered as sufficient time for any great amount of cirrhosis to develop in connection with obstruction, and the failure of Steinhaus to find it is not strong evidence of a negative character.

The recent work of Vaughan Harley is quite conclusive from the experimental stand-point in answering the question whether obstruction does or does not cause cirrhosis of the liver.   With the most perfect antiseptic technique Harley ligated the common duct or its branches in a number of animals, which he allowed to live for a considerable time after operation, either killing them at a late date or waiting until death

the blood and lymph channels are naturally highly charged with it.   It must be remembered, however, that many of the observations of earlier writers as to the presence of bile in the vomitus were made simply from the visual appearances of the ejecta, and not from careful chemical tests.

should ensue from the morbid changes caused by the obstruction.   In practically every case Harley found a definite increase of connective tissue in the liver about the bile-passages—that is, a true interlobular cirrhosis—moreover, there was no evidence that he had at any time infected the liver or any of the bile channels.

It is interesting in this connection that Nicoti and Richaud have described in dogs a condition of biliary cirrhosis of the liver dependent on the presence of gregarines in the branches of the hepatic duct. Complete obstruction of these branches is thus caused, with the resulting dilatation of the ducts behind this obstruction and a growth of connective tissue about these dilated passages.   There are numerous new-formed bloodvessels and new-formed bile-ducts in the connective tissue.

Macroscopically the livers are enlarged and cirrhotic, cutting with great difficulty and showing considerable fibrosis. We have thus a condition of obstructive biliary cirrhosis in animals quite similar to that seen in man, and yet not caused by any experimental interference.

In *man* the question of the positive causation of cirrhosis of the liver by the obstruction to the flow of bile naturally has a different aspect, inasmuch as we are unable to produce experimentally this obstruction and to note the changes in the liver which would follow from it.   We are, therefore, compelled in answering this question to examine the number of cases in which cirrhosis of the liver is seen in connection with a pathological obstruction to the ducts of the liver and to bring evidence in favor of the etiological relationship between the two by the number of cases of this combination which can be found.

Mangelsdorff, in 1882, reported 184 cases in which cirrhosis of the liver was associated with an obliteration of the bile-duct and in which there was no evidence that there were other etiological factors involved in causing this cirrhosis. Since 1882 we have been able to find twenty-four more cases in which as well an obliteration of the ducts of the liver seem to be the only causative agency in producing the chronic interstitial hepatitis.   In all of these cases the usual factors of alcohol, syphilis, and poisonous intoxications which are seen in cirrhotic cases may be eliminated by careful study of the case-reports.

We thus have a total of 208 reported cases of cirrhosis of the liver in which the complete retention of the hepatic secretion and its subsequent action on the hepatic parenchyma is the only factor which can be shown to have any etiological influence in producing this cirrhosis.

This number at first sight seems rather small, especially that collection of cases since 1882; but if we remember, however, that Mangelsdorff's report includes all of the cases reported from 1822 to 1882, and that a very large amount of the work done on the liver occurred in the decade from 1870 to 1880, the apparent discrepancy between the

number of cases reported up to 1882 and since then is thus explained. Moreover, cirrhosis of the liver itself is comparatively rare, and to be able to quote a series of over 200 cases in which the factor of obliteration of the ducts alone is the only agency which can be cited as causing the cirrhosis is sufficient, from a pathological stand-point, to show that obliteration of the ducts and cirrhosis of the liver are definitely associated as cause and effect.

ETIOLOGY OF THIS CIRRHOSIS SEEN IN OBSTRUCTION.   There are various views as to the actual cause of the cirrhosis of the liver which has been noted in connection with obstruction to the flow of bile. Observers have been divided in their opinions, and have maintained, on the one hand, that the stasis of bile alone was sufficient to cause cirrhosis, and, on the other hand, that there was always an inflammation of the bile-ducts, subsequent to this stasis, which caused a new growth of connective tissue in the liver.   Charcot maintained that the retention of bile alone by its action on the liver cells was quite sufficient to cause the fibrosis seen in this organ ; but Litten, on the contrary, considered that obstruction alone would not cause cirrhosis, but that there was in all cases an inflammation of the walls of the ducts.   The latter cited in favor of his view a number of cases of gallstones where the stones were round and smooth and had caused no inflammation of the ducts and no cirrhosis of the liver.   He contrasted these cases with those in which the gallstones were rough and sharp-edged, and had caused an inflammation of the ducts and the subsequent development of fibrous tissue.   Litten, as well, operated on a number of animals under antiseptic precautions, ligating the ducts, but obtaining no cirrhosis ; he did obtain a cirrhosis, however, by the injection of croton oil and other irritating substances into the common duct.

As we have pointed out above, the association of cirrhosis of the liver and the presence of rough, sharp-edged gallstones is explained by the complete obliteration of the ducts caused by the ulceration of these stones and the subsequent growth of scar-tissue quite as well as by the inflammation of the bile channels.

Gerhardt, in 1892, who had noted after ligature of the ducts the presence of many necrotic areas in the liver cells, endeavored experimentally to explain these necrotic areas in cases where there was obstruction to the flow of bile.   He took one set of animals in which he ligated the common ducts, estimated the pressure of bile behind the ligature, and found it to be between 2 and 4 cm. of water.   The livers of these animals showed necrotic areas.   He now repeated the experiment in another set of animals, but drew off the bile and passed salt solution into the ducts under a pressure of 50 cm. of water.   The livers of these animals showed no necrosis, and he therefore concluded that it was the long-continued action of the bile on the liver cell which

caused the slow cell death, not the pressure caused by the biliary stasis in the ducts themselves.

The *inflammatory origin* of the fibrous tissue seen in the livers of obstructive cirrhosis has been supported by a number of observations in which various micro-organisms were found in the liver. As we have stated above, in one of the cases in Montreal the number of these micro-organisms was so great as to lead to the belief that they might be a causal factor in producing the cirrhosis. Subsequent experiments, however, show that the majority of the livers of man and animals contain various forms of micro-organisms in their normal healthy condition, and, therefore, the mere finding of bacteria in cirrhotic livers cannot be considered as a proof that the cirrhosis is dependent upon the presence of these bacteria. In two at least of the cases studied here there was no evidence that bacteria were present to any greater degree than they are present in the normal hepatic parenchyma. Moreover, Vaughan Harley has recently sent to the Molson Pathological Laboratory in Montreal several specimens from the livers of the animals in which he had caused experimental cirrhosis. Dr. Adami has carefully studied these specimens in order to determine, if possible, whether micro-organisms are present or not, and he has uniformly failed to find any bacteria in these livers, either by the ordinary methods of staining, by Gram's method, or by the use of carbolthionin. It is natural to conclude, therefore, that from the experimental stand-point, at least, obstruction to the flow of bile will cause cirrhosis of the liver without infection of the bile channels.

In man, of course, this question has a somewhat different phase, for there is in practically all cases a considerable inflammation of the walls of the bile channels and often a slight inflammation of the smaller bloodvessels, the small-celled infiltration between the lobules often reaching an extreme grade, the appearance suggesting even the formation of small abscesses. Hence, it is impossible to find cases of cirrhosis of the liver in man associated with obstruction where one can say with certainty that the obstruction to the flow of bile has been the only factor concerned in causing the increase of fibrous tissue. We may thus conclude that the damming back of bile caused by the obliteration of the ducts does not always lead to the cirrhosis *per se*, but may lead to it as well by causing a certain amount of inflammation of the bile channels.

Even if we grant that the retention of bile and its poisonous action on the liver cells is the cause of the cirrhosis of the liver, we are still in some doubt as to the path which the bile traverses in order to come in contact with the hepatic parenchyma, for Vaughan Harley has recently shown that the jaundice which develops after the ligature of the bile-ducts will not supervene with the same rapidity if the thoracic duct be

tied as well. Evidently the lymphatic circulation is the path by which the bile reaches the different tissues and organs of the body, and it may be possible that the bile may reach the liver cells by passing from the bile-ducts through the lymphatic circulation and back again into the liver cells themselves.

VARIETIES OF BILIARY CIRRHOSIS. Under the title of biliary cirrhosis there have been described at least three different conditions—the biliary cirrhosis of children in India, Hanot's cirrhosis or hypertrophic cirrhosis with jaundice, and the cirrhosis dependent upon obstruction of the bile passages.

The first variety has been emphasized especially by Gibbons and McNally, who have reported a number of cases from the poorer classes of the inhabitants of East India. The children subject to this disease show during life a painless enlargement of the liver, a voracious appetite alternating with anorexia, a languid, fretful disposition, great thirst, fever, splenic enlargement, constipation, and clay-colored stools, with jaundice and eventually ascites, increasing up to the time of death. At autopsy the livers are enlarged, bile stained, typically cirrhotic, their microscopical examination showing, moreover, a mixed interlobular and intralobular type of cirrhosis, with a great degeneration of the liver cells and many increased bile-ducts. The cirrhosis of this organ is very irregular, often single groups of liver cells, or even single cells, being isolated and surrounded or replaced by connective tissue. It is thus really a pericellular cirrhosis. The etiology of this variety is supposed to lie in the use of unsuitable food and in the subjection to bad hygienic conditions, to which the children of the poorer classes in India are especially liable. It is not impossible that, like Hanot's cirrhosis, to which this variety seems to bear some resemblance, the cause of the disease of the liver may be primarily infectious.

Hanot's Cirrhosis. The cases usually recorded under the title of *biliary cirrhosis* correspond with fair accuracy to the description given by Hanot of his *hypertrophic cirrhosis* with *jaundice*, and Hanot himself makes use of the terms biliary cirrhosis in describing the disease which he has named. In this disease the main clinical symptoms are dull pain in the region of the liver; acute attacks of abdominal pain, resembling hepatic colic; a slight jaundice, increasing after each attack; a gradual increase in the size of the liver and in the circumference of the abdomen, with the maintenance of fair general health and an excellent appetite for some time. The stools are not clay-colored, but the urine contains an abundance of bile pigment; there is no ascites and no enlargement of the abdominal veins, although there may be intestinal hemorrhage; the fever, at first slight, may become marked, the temperature rising in the evening to 102° or 104° F., and the pyrexia assuming the character of hepatic intermittent fever. The bodily

strength is maintained, the emaciation is slow, and the course of the disease chronic.

There are, however, acute cases of Hanot's cirrhosis in which the patients die within a few months after their first observation by clinicians, having practically no jaundice and few biliary symptoms except an enlargement of the liver, but showing at autopsy a hypertrophic cirrhosis of the liver corresponding to the type described by Hanot, without obstruction to the flow of bile.

Pathologically, in Hanot's cirrhosis the liver is symmetrically enlarged and smooth; on section it cuts with difficulty, and has a jaundiced, dark-green appearance; the common and hepatic ducts are quite pervious and show no obstruction to the flow of bile, although the smaller ducts may be slightly dilated.

Microscopically, about the larger bile passages there is development of new fibrous tissue in concentric layers, this new tissue usually lying between the lobules, but at times penetrating within them, producing an intralobular as well as an interlobular type of cirrhosis. More frequently, however, the cirrhosis approaches the pericellular type— that is, there are individual groups of liver cells at the edges of the lobules, which are being cut off by the new connective tissue. There is a chronic diffuse angiocholitis and a periangiocholitis, but the new tissue is more of a replacement than of a productive inflammatory type.

We are in some doubt as to the etiology of Hanot's cirrhosis, and Hanot himself has not given any exact evidence to solve this problem. He has stated that the cirrhosis may be due to angiocholitis of the bile passages, to gallstones, and to obstruction to the flow of bile, and intimates that it may be infectious in origin. Goluboff, who has given the most accurate description of Hanot's cirrhosis published recently, attributes the fibrosis of the liver in his cases, which he described as biliary cirrhosis, to angiocholitis of the smaller bile-ducts, in which the retained bile causes a new growth of connective tissue between the lobules by the direct chemical or toxic action of the bile on the liver cells, the biliary stasis being due to the obstruction caused by the inflammation of the larger bile-ducts. The usual view, moreover, now maintained by the French school of pathologists is that Hanot's cirrhosis is caused primarily by infection, and is thus to be differentiated entirely from cases of cirrhosis of the liver seen in obstruction to the flow of bile caused by gallstones or by congenital obliteration of the bile-ducts.

COMPARISON OF DIFFERENT VARIETIES OF CIRRHOSIS. Let us now compare Hanot's cirrhosis with those cases of obstruction cirrhosis which we have described, to see, if possible, whether the two conditions can be differentiated on pathological and clinical grounds.

In Hanot's cirrhosis the liver is uniformly enlarged, the surface smooth, without perihepatitis, the contraction to which all cirrhotic

livers are liable taking place in only a few isolated instances. It must be remembered, however, that there are cases in which patients pass through a cycle of symptoms characteristic of hypertrophic cirrhosis, with jaundice, and at autopsy reveal a small hobnailed liver; such cases are necessarily quite rare. The bile-ducts in this variety are seldom dilated, and when so only to a moderate extent, their lumen being always pervious.

In obstructive cirrhosis the liver may be enormously enlarged, as in the congenital cases, or it may approach in character the hobnailed liver of Laennec. There is usually considerable perihepatitis, the bile passages are always greatly dilated, and there is always, of course, a complete obstruction of some one of the ducts.

On section the livers in both diseases cut with great difficulty, revealing the presence of large amounts of new fibrous tissue distributed in islands between the hepatic lobules, the only difference between the two conditions here being the enormous dilatation of the bile-ducts which the obstructive cirrhosis reveals in contrast to the mild dilatation which Hanot's cirrhosis shows.

Microscopical examination reveals almost identical conditions in the livers of obstruction and the livers of ordinary hypertrophic cirrhosis with jaundice. In both cases the connective tissue develops about the bile passages, between the lobules of the liver, and may either lie between these lobules alone, causing an interlobular cirrhosis, or may penetrate within the lobules, causing an intralobular type. In both cases where the fibroblasts surround at the edge of the lobule individual liver cells the type of cirrhosis becomes more nearly that of a pericellular cirrhosis. There is the same inflammation of the smaller bile channels, the same congestion of the bloodvessels, and the same degeneration of the liver cells at the edge of the lobule. The reduplication of bile-ducts, as we have already shown, reaches an extreme grade in both cases. It is as yet impossible to say whether the wreath-like arrangement of these ducts which has been noted in cases of obstruction can be discovered as well in Hanot's cirrhosis, further study of the latter disease being necessary before any positive assertions can be made in regard to the appearance of this wreath-like distribution in hypertrophic cirrhosis with jaundice.

The autopsy findings in the two diseases differ only in the changes subsequent to the obstruction to the portal circulation which is seen in the cirrhosis of the liver dependent upon obstruction of the bile-passages—that is, œdema of the extremities, abdominal ascites, and a dilatation of the abdominal veins—a triad of symptoms which appears seldom or never in Hanot's cirrhosis.

From the *etiological* stand-point the two conditions naturally differ greatly in their causation: Hanot's cirrhosis is generally an infectious

process—that is to say, the presence of the symptoms and the patho-
logical findings of Hanot's cirrhosis are better explained by the sup-
posed entrance of micro-organisms into the biliary passages than they
are by any other known factors.   The changes seen in obstructive
cirrhosis follow invariably the complete obliteration of some one of the
bile-ducts, but both in Hanot's cirrhosis and in the variety of cirrhosis
which we are especially considering we are compelled to look to the
inflammation of the smaller bile passages as being the immediate cause
of the production of the fibrous tissue between the lobules of the liver.

We thus see that from pathological grounds alone the changes seen
in the two varieties of cirrhosis are quite similar, and that it would be
impossible from our present knowledge to say, on examination of any
particular variety of cirrhosis of the liver, whether we were dealing
with simple hypertrophic cirrhosis with jaundice or with a case of
obstructive biliary cirrhosis.

Clinically, the symptoms of the two diseases differ in the widest ex-
tent in their occurrence, in their intensity, and in the rapidity with
which the patients succumb to the morbid changes.   In hypertrophic
cirrhosis with jaundice we have a slow, chronic disease, where the gen-
eral health is maintained for some time ; emaciation and wasting are
slow, the appetite good, with a little gastro-intestinal disturbance.   The
jaundice is insidious in its onset, the increase of the icterus being coin-
cident with paroxysmal attacks of hepatic colic.   The urine is loaded
with bile pigment, although the bile always finds its way into the in-
testines, as is shown by the presence of bile-stained stools.   The liver
is enlarged throughout the whole course of the disease except in rare
instances, and when the contraction of this organ occurs a small
amount of ascites may develop.   Fever is a constant, and, in fact, a
characteristic symptom.   It is intermittent in type and forms the basis
for that pyrexia now constantly described as hepatic intermittent fever.
The patient usually after a long period, during which he alternates
between a fairly good state of health and attacks of colic, fever, and
jaundice, very gradually loses his flesh and strength, and only at a late
date succumbs to the disease process.

In obstructive cirrhosis, however, the clinical picture is absolutely
different : the disease is acute in its onset and in its course ; emaciation
and loss of strength are rapid, anorexia and vomiting are extreme, the
headache severe, the stools invariably clay-colored, and the portal circu-
lation greatly impeded, leading to the development of ascites and the
œdema aforementioned.   Fever does not occur in uncomplicated cases
of obstructive cirrhosis ; the jaundice, sudden in its onset, is extreme
from its first appearance, a diminution of the yellowish color of the
skin and conjunctiva practically never occurring.   The systemic dis-
turbances are marked, especially the itching of the skin, with hemor-

rhages beneath its upper layer, and the headache and vomiting. The disease is rapidly progressive, the patients have no intermission of their characteristic symptoms, but rapidly lose strength and flesh, sinking into that condition of coma or of auto-intoxication which is only ended by death itself.

CONCLUSIONS. From the study of the cases of cirrhosis seen in Montreal, and from a review of the cases reported by other authors, together with the observations of experimental pathologists, we are justified in drawing a number of general conclusions :

Complete obstruction to the flow of bile in *animals* produces a cirrhosis of the liver, interlobular in character, of considerable extent, provided the animals are allowed to live a sufficient time after primary operation. This cirrhosis is due to the damming back of bile *per se*, and not to the inflammation of the walls of the smaller bile channels.

In *man*, complete obliteration of the bile-ducts caused by pathological changes leads to a cirrhosis of the liver which cannot be explained simply by the damming back of bile, but must be considered to have, as an added etiological factor, that inflammation of the walls of the biliary channels which is invariably present.

The type of the cirrhosis of the liver seen in man subsequent to obstruction of the bile passages cannot be differentiated anatomically from the type of liver seen in Hanot's hypertrophic cirrhosis with jaundice.

The symptom-complex of obliterative cirrhosis is so absolutely different from Hanot's cirrhosis in the variety of its symptoms and in the frequency with which they occur as to justify the statement that *obstructive biliary cirrhosis* is a distinct morbid condition quite apart from any other variety of cirrhosis of the liver.

SYMPTOM-COMPLEX OF HANOT'S CIRRHOSIS AND OBSTRUCTIVE
BILIARY CIRRHOSIS.

Symptoms.	Hanot's Cirrhosis.	Obstructive Cirrhosis.
Course of disease	Chronic.	Acute.
General health	Good.	Poor.
Emaciation	Slow.	Rapid.
Loss of weight	Slow.	Rapid.
Intermission of symptoms	Common.	Does not occur.
Fever	Common.	Rare.
Anorexia	Rare.	Common.
Good appetite	Common.	Rare.
Vomiting	Rare.	Common.
Jaundice	Slight at first, increasing.	Deep from the first.
Clay-colored stools	Rare.	Constant.
Bile-stained urine	Common.	Constant.
Enlargement of liver	Common.	Common.
Contraction of liver	Rare.	Common.
Ascites	Rare.	Common.
Œdema of extremities	Rare.	Common.
Caput medusæ	Rare.	Common.

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DORSAL DISLOCATION OF THE TRAPEZOID.

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DORSAL dislocation of the trapezoid, unaccompanied with fracture or dislocation of other bones, occurs so rarely that it may be looked upon as a surgical curiosity.   I could find in the *Index Medicus* and in the *Index Catalogue of the Library of the Surgeon-General's Office* the report of only one case.   This was recorded by Geo. W. Gay in the *Boston Medical and Surgical Journal* in 1869.

In this paper I shall give a summary of Gay's case, and shall report a case of injury that came to me and was diagnosed and treated as a case of simple uncomplicated dorsal dislocation of the trapezoid.

Dr. Gay's patient injured his wrist by striking a post in such a

manner that the force was brought to bear on the distal ends of the metacarpal bones of the thumb and index finger. At the time the injury was produced the wrist was in the straight position and the forearm in extension. On examination sixteen hours after the accident occurred there was found an irregular quadrangular swelling situated proximal to the base of the metacarpal bone of the index finger. The swelling seemed to extend about one-quarter of an inch beyond the level of the dorsal surfaces of the other carpal bones. It was not very tender, was of bony hardness, and could not be reduced by pressure. The metacarpal bone of the index finger did not seem shorter than normal. No crepitus was obtained, and no other injury to the wrist or hand observed.

Dr. Gay was unable to reduce the deformity. He extended the hand on the forearm at an angle of forty-five degrees and held it in this position with an anterior splint and with adhesive plaster. At the end of two weeks this dressing was removed. Five weeks later—that is, seven weeks after the injury occurred—the patient was able to move the injured wrist freely and was able to use it without causing him pain. But the deformity remained the same as it was at the time that Dr. Gay first saw the case.

The history of the case that I desire to report is as follows:

A policeman, aged thirty-nine years, struck a man with his fist in such a manner that the entire force of the blow was brought to bear on the distal end of the metacarpal bone of the index finger. The wrist-joint and elbow-joint were slightly flexed at the time the blow was delivered. Immediately afterward he suffered from pain in the injured part. This was not very severe, but was increased by movement of the hand or wrist. The pain gradually diminished till I saw him, two hours after the injury. At this time he was entered as a patient in Cook County Hospital, Chicago. On examination I found the right wrist slightly flexed. Just proximal to the base of the metacarpal bone of the index finger was a cuboidal swelling, of bony hardness, that extended nearly a centimetre beyond the dorsal surfaces of the other carpal bones. This swelling was not easily movable, was not painful, and was but slightly tender on pressure. No crepitus was obtained. The soft structures showed very little swelling; there was no evidence of extravasation of blood. No shortening of the metacarpal bone of the index finger was found, and no widening of the wrist could be made out. No attempt was made to reduce the deformity at this time. Six hours later the fluoroscope was used and showed the injury to be a simple dorsal displacement of the trapezoid.

Eight hours later I attempted to reduce the deformity. In this I was only partially successful. I made extension on the index finger, and, at the same time, made direct pressure on the dorsal swelling. The deformity was partially reduced, but the displaced bone still projected nearly one-fourth of an inch beyond the dorsal surfaces of the other carpal bones. I then held the hand in a straight position—neither flexed nor extended on the forearm—and wound a piece of

adhesive plaster, two inches wide, several times around the wrist just above the carpal extremities of the metacarpal bones of the thumb and little finger. The extremity was placed in a sling, and the patient was told to return to the hospital on the third day. He did not come back, and I did not succeed in finding him till fifteen weeks later. At this time the deformity was the same as it was after I had attempted to reduce it, except that the bone was firmly fixed and its borders and angles could not be made out. There was no limitation of motion in the wrist-joint.
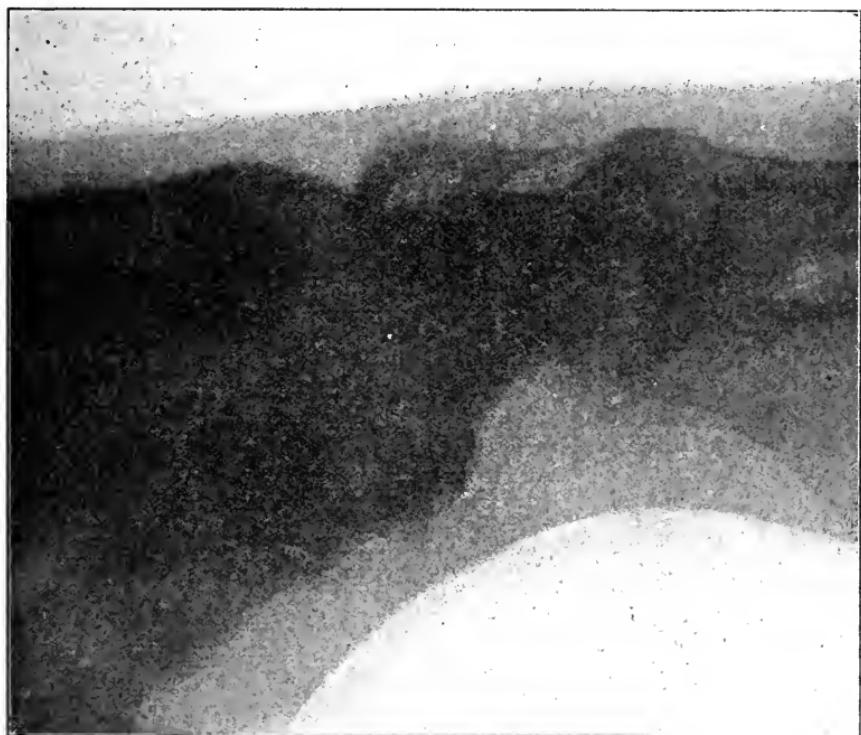
Skiagraph showing dislocated trapezoid.

The patient told me that he carried the injured member in a sling for five days. He then went to work on the police force, and on the tenth day after the injury he removed the adhesive plaster. He said that the wrist had pained him somewhat when he used it, but that it was gradually improving and was nearly as strong and as useful as it ever had been.

I tried experimentally, on the cadaver, to produce dorsal dislocations of the trapezoid by simulating the mode of production in these two cases. I had the arm and wrist held both in the flexed and in the straight positions, and applied force to the distal end of the metacarpal bone of the index finger and to the metacarpal bones of the index finger and thumb. In each of the twelve wrists that I experimented on either the metacarpal bone of the index finger was fractured, or the ligaments

were so torn as to render it impossible to apply force in the direction desired. In no case was I able to produce a simple uncomplicated dorsal displacement of the trapezoid. From the results of the foregoing experiments it seemed probable to me that the exciting cause—trauma —is not, under ordinary circumstances, sufficient to produce the injury being discussed. I therefore looked for predisposing factors, and my attention first turned to the anatomy of the parts involved.

The trapezoid is wedge-shaped, the base of the wedge forming the dorsal surface of the bone. Its superior and inferior surfaces are con- cave from before backward, but the concavity, in most cases, is slight, and doubtless aids but little in keeping the bone in its normal position. Therefore, pressure brought to bear on the lateral or superior or inferior surfaces of the trapezoid will tend to displace it in a posterior or dorsal direction. Under ordinary circumstances, it is probable that pressure on the lateral surfaces of the trapezoid has very little effect in displac- ing it dorsally ; and force applied to the distal end of the metacarpal bone of the index finger is transmitted to the trapezium and os mag- num. These observations led me to believe that the shape of the trapezoid predisposes it to dorsal displacement, and this I verified by the following experiments : After freeing the trapezoid from the other carpal bones, and after separating the trapezium from the os magnum so that force applied to the distal end of the metacarpal bone of the index finger would affect the trapezoid, I was able, on the cadaver, to produce simple dorsal dislocations of this bone by holding the forearm and wrist firmly and applying force to the distal end of the second meta- carpal. Slight flexion of the metacarpi on the carpal bones facilitated the displacements. In the normal adult this dislocation is prevented from occurring by the presence of the soft tissues—principally by the ligaments.

The ligaments of the trapezoid are usually divided, for description, into dorsal, palmar, and interosseous. The palmar ligaments are stronger than are the dorsal, and the dorsal ligaments of the trapezoid are less strong than are the corresponding ones of any other carpal bone of the second row except the trapezium. The interosseous liga- ment between the trapezoid and the os magnum is situated near the dorsal surfaces of the bones. Morris says that there is no interosseous ligament between the trapezoid and the trapezium. Other writers claim that this ligament is present in the majority of cases. I was unable to find a report of examinations made to determine the percentage of cases in which this ligament is absent. I have examined fourteen cases, and have found in each case an interosseous ligament between the trapezoid and the trapezium.

It occurred to me that I might be able to produce an artificial dis- location of the trapezoid in cases in which the interosseous ligament

between this bone and the trapezium was absent or had been divided.
I therefore cut the ligament and then tried to dislocate the trapezoid
dorsally by holding the forearm and wrist firmly and applying force
to the distal end of the metacarpal bone of the index finger. I did
this in ten cases, but failed to produce a single uncomplicated dorsal
displacement. I then, in the same cases, divided the dorsal ligaments
between the trapezoid and the metacarpal bone of the index finger.
After doing this I was able, by using the method described in the fore-
going, to dislocate the trapezoid posteriorly in every case. But the
results were not all alike—sometimes the bone would be displaced
a distance corresponding to one-fourth or one-half of its anterior-
posterior diameter ; again, it would be thrown dorsally only a few lines.

These observations and experiments led me to believe that it was
probable that in Gay's case, and in the case that came under my care,
there was a congenital weakness or absence of the ligaments, or a mal-
development of the carpal bones, or a combination of these conditions
which rendered it possible for an uncomplicated dorsal dislocation of
the trapezoid to be produced.

REVIEWS.

The Principles and Practice of Hydrotherapy: A Guide to the
Application of Water in Disease. For Students and Practi-
tioners of Medicine. By Simon Baruch, M.D., Visiting Physician
to the J. Hood Wright Memorial (formerly Manhattan General) Hospital ;
Consulting Physician to the Montefiore Home for Chronic Invalids ; Mem-
ber of the New York Academy of Medicine ; formerly Gynecologist to the
Northeastern Dispensary ; Physician for Eye, Ear, and Throat at the
Northwestern Dispensary of New York City ; Physician and Surgeon to
the New York Juvenile Asylum, and Chief of the Medical Staff of the
Montefiore Home for Chronic Invalids.   With numerous illustrations.
8 vo., pp. xx., 504.   New York : William Wood & Co., 1899.

The preface to this excellent manual upon an important and much
neglected therapeutic art states that, different from all other works on
its subject, '' this book is written by a general practitioner for the guid-
ance of his colleagues.''   It represents the observations of the author,
who has labored in every branch of medicine, and has gathered the
data upon which his recommendations are based, from a private and
hospital practice of more than thirty years ; including a special institu-
tion practice of seven years, in which over one hundred thousand
'' hydriatric treatments '' have been recorded.   The author begins by
defining hydrotherapy as '' the method of applying water in disease.''
We should substitute for '' disease '' in this definition—the manage-
ment of the sick.   The principle, however, is the same.   Hydrothera-
peutics is not concerned with cold water alone, nor with external
application only, but includes the therapeutic use of water in any form,
from ice to steam, internally and externally.   Nor is hydrotherapy to
be confounded, as the author justly remarks, with '' hydropathy ;'' the
latter barbarous term being applied to the quack systems of the treat-
ment of all diseases by means of the external use of water, and, princi-
pally, cold water, following Priessnitz.   Other terms referring to the
subject in general are the adjectives '' hydriatric '' and '' hydriatic.''
The former is a short and expressive substitute for the adjective
'' hydrotherapeutic ;'' the latter an adjective in common use qualifying
nouns connected with the use of water in medicine or for other pur-
poses.   Its correct derivation the author has been unable to obtain, and
he would like to have it banished from medical terminology.   The book
is divided into two parts.
    Part I. deals with principles.   It includes studies of the physical
properties of water and of its effect upon the human body in health, the
various subdivisions of this part making four chapters of eighty pages.
Diagrams, charts, and tables are given to illustrate important data.
The anatomy and physiology of the skin necessarily receive consider-

able attention, as the results of external applications of water are largely
due to the response of the nerves and vessels of the skin to their thera-
peutic environment.   The skin, by which the author means not merely
the cutaneous structure, *per se,* but also the vascular, nervous, and
glandular structures bound up therewith, has important functions as an
organ of sense, general and special, as an organ of secretion and excre-
tion, as a supplementary organ of respiration, and as a heat regulator;
the latter being an important property in connection with hydrothera-
peutics.   Temperature effects, however, are not the only results of the
external application of water, but mechanical, and to a minor degree
chemical, effects are produced as well.   These act as stimuli to the
peripheral sensory nerves, irritation being conveyed to portions of the
central nervous system, and thence reflected by the motor fibres to the
various parts that the physician desires to influence; or changes of the
local innervation of the part which receives the applications may be
produced by effects upon the ganglionic centres in the course of the
nerve supply of the vessels.   In addition, there are direct effects upon
the vessel walls, upon the secretory structures, and, mechanically, upon
the superficial or even deep structures as a whole, according to the sus-
ceptibility of the part or of the organism, and the force and suddenness
of the impact.   The author considers, therefore, the influence of water
applications upon circulation, respiration, temperature, tissue change,
and secretion, setting forth the results of experimenters with fulness
and some critical comment.   Among the original observations reported
in this connection are studies of the effect of various hydriatric pro-
cedures upon the blood constituents in health and disease, made at the
Montefiore Home.

Part II., consisting of 23 chapters and 350 pages, refers to the prac-
tice of hydrotherapy.   The author has made no attempt to be encyclo-
pedic in description, citation, or history, but confines himself to such pro-
cedures as personal experience has proved to be useful.   Each procedure
is described in detail, and illustrated by drawings.   Its rationale is then
fully set forth, and, finally, its therapeutic indications enumerated.   In
the discussion of certain subjects illustrative cases are cited or statistics
referred to, this latter feature being specially notable in the section
upon the Brand treatment of typhoid fever.   The author's well-known
insistence upon precision in the technique of hydrotherapy is admirably
illustrated in this portion of his work.   As he has somewhere remarked,
to tell a patient to " use cold water " or " use hot water," is like tell-
ing a patient to take " some quinine " or " some morphine."   Indeed,
the latter is a little nearer accuracy, and no more dangerous; it at
least indicates the method of administration.   Hydrotherapeutic pro-
cedures must be carefully adapted to the individual patient and the
particular stage of general or special morbid processes present at the
time of the application.   The temperature, duration, pressure, and
manner of application, to the minutest detail, must be specifically pre-
scribed.   Only thus can hydrotherapeutics be scientifically practised and
useful results anticipated.

The author describes, under the head of external applications, the
following procedures: Ablution, the half bath, affusion, the sheet
bath, the cold rub, the wet pack, the wet compress, the full bath (the
latter subject being divided into the following heads: the cold full
bath, the warm full bath, and the hammock bath), the douche, the hip

bath, and irrigation (including lavage, enteroclysis, irrigation by the genito-urinary canals, and miscellaneous forms); then come methods of cooling and heating internal parts, including the prostatic cooler, the perineal douche, the rectal cooler, the cooling sound used in prostatitis, etc.; and a chapter is devoted to the internal uses of water. Several chapters are devoted to the practical application of hydrotherapy in acute and chronic diseases; the various therapeutic indications scattered through the book under various procedures being summarized and supplemented under the headings of special diseases.

An excellent chapter on " the hydriatric prescription " gives wise directions as to the method of ordering applications, and warns against the errors commonly committed. The concluding chapter is devoted to an historical epitome, and a few earnest words as to the necessity for instruction in hydrotherapy. The author is entitled to much credit, not alone for his earnestness in introducing important therapeutic measures into general use in this couutry (for, although he had been preceded by many in urging these measures, he was the first to systematically devote himself to the subject, and it is he who does, not he who thinks, that deserves the credit in such matters), but also for the clear and complete manner in which he has treated the subject in his book. There is no longer an excuse for anyone remaining uninformed on the subject of hydrotherapy. The knowledge is no longer far off in the heaven of French books or the repulsive depths of German books, but here at home before us, this day, in our own tongue, to learn and to do. Dr. Baruch's book contains all the essentials and many details and valuable suggestions from personal experience. Perhaps critical pruning and condensation, and some rearrangement of material to make discussions more consecutive, may be improvements in future editions.

One naturally turns with great interest to the discussion of the Brand treatment of typhoid fever, with which Dr. Baruch's name is historically and indissolubly connected, and he finds a full and careful discussion, with, perhaps, too much citation of individual opinions and too much insistence upon the strict execution of Brand's method. The author dismisses most of the objections urged against the latter as puerile or absurd. It is true that some of the objections which he cites may thus be characterized, but not all the objections made. The reviewer's practice is to bathe typhoid fever patients when they need it, at such a temperature of patient and bath, for such a time, and in such a manner, as the particular indications of the particular case and particular time commend. He has had no cause to regret this method, carried out for more than fifteen years, and never having been led astray by the antipyrine seduction, lacks perhaps the enthusiasm of the convert which Dr. Baruch here exhibits. There is no doubt that the routine application of Brand's systematic treatment to every case of typhoid fever exhibiting a temperature of 103° F. in the rectum, is better and will save more lives than any other routine treatment; but we consider all routine treatment to be bad treatment. A general plan for the circumstances presented in a specific group of morbid and reactionary (salutary) phenomena of known succession and coincidence, to be modified in accordance with the variations of succession, coincidence, and degree of these phenomena, and the appearance of irregular phenomena, is always better. Thus the Brand bath may be taken as the type of procedures for the typical case of typhoid fever; but as we so rarely see

the typical case of typhoid fever in actual practice, so is there rarely occasion continuously to apply the typical Brand bath with systematic rigor. Hydrotherapeutic measures by all means, and bathing in the majority of cases, and the full bath at a temperature below 80° F., usually, and at 65° F. not rarely; but individual modification, and modification from day to day, perhaps modification from bath to bath, are always necessary. To substitute for the chart of continuous pyrexia with moderate and regular remissions and exacerbations characterizing typhoid fever, a temperature-chart of violent fluctuations resembling hectic fever, is not desirable; and we must again record our objection to any procedure which in a single bath reduces the temperature more than about 2° F. With Dr. Baruch we look upon the effects of cold bathing as affecting nutrition in general, and neuro-vascular processes specially, rather than thermic processes merely, temperature simply being an indication of the activity of morbid and reactionary phenomena; but we prefer these to be altered gradually rather than suddenly, especially when the sudden change is followed by equally sudden return to previous force.

Other important articles are those on the uses of water in cases of acute lobar pneumonia, bronchopneumonia, phthisis, neurasthenia, dyspepsia, and cholera. While our own experience is not always on all-fours with the author's, his acquaintance with the methods discussed and their special applications is so much the greater, that we cannot refuse to give his views correspondingly greater weight.

The profound impressions which hydriatric procedures are capable of making upon the functions of organic life cannot be studied without deepening the conviction that these effects ought to be utilized in medicine to a far greater extent than is now the case. It is impossible for the general practitioner to become thoroughly acquainted with their technique or to take time to apply them in all suitable cases, but he should know their rationale and their scope of usefulness. Whenever possible, and notably in the acute infections, he should apply them with the help of trained nurses or of members of the family; and for chronic affections requiring special facilities, knowledge, and apparatus, there should be in every important medical centre an institution supported by the profession at large, to which patients could be referred with general or special prescription. At present, patients who could be benefited by the rational and scientific use of water are deprived of the treatment, or dependent upon the enthusiasm and persistence of individual physicians; and there are not many Baruchs. S. S. C.

A MANUAL OF OPERATIVE SURGERY. By L. A. STIMSON, B.A., M.D., and JOHN ROGERS, B.A., M.D. Philadelphia and New York: Lea Brothers & Co., 1900.

AN operative surgery to be of the greatest usefulness should be concise and clear in statement and be well illustrated. Stimson has in this edition succeeded in meeting these requirements in the first instance. The illustrations are good, but there is still lacking something to make them entirely satisfactory. The descriptions of operative procedures are

very satisfactory. I know of no manual that is so well adapted to the needs of the student and practitioner. Anatomical plates are wisely used to render intelligible various steps. The transverse sections of the extremities in the part devoted to the ligature of arteries at different levels are helpful. Operations upon the intestines are well illustrated; many special operations are described. A very attractive method has been used throughout the greater part of the *Manual* in that the procedures of different surgeons are alluded to, and valuable references are made to articles in medical literature where complete descriptions of original methods may be found. The *Manual* is worthy to occupy a place beside such classical books as Treves' *Operative Surgery.*

<div style="text-align:right">C. L. S.</div>

ATLAS AND EPITOME OF SPECIAL PATHOLOGIC HISTOLOGY. By DOCENT DR. HERMANN DÜRCK. Edited by LUDVIG HEKTOEN, M.D. Philadelphia: W. B. Saunders & Co.

As in the other books of this series, the illustrations are the special feature. The subject of pathological histology is perhaps more susceptible to this form of exploitation than any other in the domain of medical science, chiefly because of the excessive clearness and fine definition of the preparations ordinarily studied and the employment of staining methods that not only accentuate this clearness, but add a not wholly inartistic element to it.

Criticising, then, the illustrations, we can say without hesitation that they are perfect from their stand-point. Evidently preparations have been carefully made, then copied in water-colors, and the lithographs prepared from these. The details are accurately given, the colors are clear and approximate so closely to those obtained by the ordinary staining methods that they may, for all ordinary purposes, be considered identical. There has always been some doubt on the part of the makers of pathological histological text-books as to whether photo-micrographs are to be preferred to free-hand drawings; of course, it has been recognized that there is much to be said on both sides. The photograph is more accurate, but on account of the ability of the observer to change the focus continually and to study the relations of parts lying in different planes, it is doubtful if the drawing does not reproduce the object seen with greater fidelity. We are certain, at any rate, that the student can profit more by plates such as are given here than by the more elaborate photo-micrographs. The expert, however, with a fairly good collection of specimens in his laboratory, would prefer the latter. The preparations here reproduced represent the commoner morbid alterations of tissues; but as this book is prepared especially for students, a more admirable selection of subjects could with difficulty have been made.

Criticising the selection of plates and the methods of staining employed, we can find little that is not praiseworthy. We wish to call particular attention to the thoroughness with which the modern methods have been depicted. There are several plates in which the results of staining by Sudan III. have been employed. In the section on diseases of the bloodvessels, pictures of the elastica stain have been repro-

duced. Weigert's fibrin method, of course, is familiar, and is part of ordinary laboratory technique; nevertheless, some of the illustrations in which it has been employed are exceedingly beautiful. It might, perhaps, have been advantageous to have introduced a few plates showing the specific reactions of certain degeneration products, such as the amyloid substance with gentian violet, or mucin with thionin. Von Gieson's stain does not appear to have been employed as frequently as the beauty of its results would warrant.

As for the text, but little can be said; it is clear and concise, and presents the present status of the subject about as well as it could be presented within these limits. Professor Hektoen has gone over it carefully, and his additions, while not nearly as numerous as we could have desired from him, are all of considerable value.   J. S.

A PRACTICAL TREATISE ON DISEASES OF THE SKIN, FOR THE USE OF STUDENTS AND PRACTITIONERS. By JAMES NEVINS HYDE, A.M., M.D., Professor of Skin, Genito-urinary, and Venereal Diseases, Rush Medical College, Chicago; Dermatologist to the Presbyterian, Augustana, and Michael Reese Hospitals of Chicago; and Consulting Dermatologist to the Chicago Hospital for Women and Children; and FRANK HUGH MONTGOMERY, M.D., Assistant Professor of Skin, Genito-urinary, and Venereal Diseases, Rush Medical College, Chicago; Professor of Skin and Venereal Diseases, Chicago Clinical School; Attending Physician for Skin and Venereal Diseases, St. Elizabeth Hospital, Chicago. Fifth revised and enlarged edition, illustrated with 3 engravings and 24 plates in colors and monochrome. Philadelphia and New York: Lea Brothers & Co., 1900.

THE esteem in which this standard treatise is held by the profession is amply attested by the fact that another edition has been found necessary two years after the appearance of the fourth. Although the changes are comparatively unimportant, owing to the brief period which has elapsed since the fourth edition was issued, the revision has been done in no perfunctory fashion, alterations and additions being plentifully scattered throughout the book, bringing it fully up to date. Two new chapters have been added—one on Porokeratosis, that very curious affection to which Mibelli first called attention, and one on Blastomycetic Dermatitis—a subject of great and apparently growing importance, both from a clinical and pathological stand-point, and one upon which the authors speak with authority. The value of the volume has been materially enhanced by the addition of a number of full-page illustrations, which are excellent examples of the fidelity with which photography may reproduce the appearances of cutaneous eruptions in properly selected cases. Such illustrations really illustrate, and are of the greatest value in helping to make plainer the descriptions of disease found in the text.

We note with especial satisfaction the wise conservatism of the authors in discussing the etiology of eczema. Under the influence of the teachings and writings of that indefatigable worker, Unna, and his

followers, there is a great and constantly growing tendency among recent writers to place this affection among the maladies due to micro-organisms; but we quite agree with our authors that the etiological relationship of the micro-organisms found in eczema is by no means yet determined, and that the causes of this protean affection are many and varied.

In conclusion, we can heartily commend this treatise as one of the best in the language, and a reliable guide for the student and practitioner.

M. B. H.

INJURIES TO THE EYE IN THEIR MEDICO-LEGAL ASPECT. By S. BAUDRY, M.D. Translated from the original by ALFRED JAMES OSTHEIMER, JR., M.D., of Philadelphia, Pa. Revised and edited by CHARLES A. OLIVER, A.M., M.D. With an Adaptation of the Medico-legal Chapter to the Courts of the United States of America, by CHARLES SINKLER, ESQ. Philadelphia, New York, and Chicago: The F. A. Davis Co., 1900.

As stated in the preface, this monograph was written with the idea of guiding the legal expert in trying cases where a profound knowledge of both the internal and external diseases of the visual apparatus is demanded, as well as to aid the ophthalmologist in estimating accurately the damage to the individual caused by injury. It contains a concise account of the traumatic lesions of the eye and its adnexa, especially from a prognostic stand-point.

The book is very readable, and the translation, which the reviewer has had an opportunity of verifying, has been conscientiously performed. The editor has fulfilled his duties with his usual care, and the work deserves to be well received by the profession.   W. C. P.

NERVOUS AND MENTAL DISEASES: A MANUAL FOR STUDENTS AND PRACTITIONERS. By CHARLES S. POTTS, M.D. Philadelphia and New York: Lea Brothers & Co., 1900.

IN this small work the author has given to the student a clear, concise, and easily comprehended presentation of the subject of nervous and mental diseases. The different subjects are very thoroughly treated for so small a work. The treatment of many of the symptomatic diseases under separate headings adds to the value of the book. The neuron theory is accepted and made use of in describing the system diseases of the spinal cord. This, however, is of questionable value in a book of this size, inasmuch as it lends an element of uncertainty to many statements of little practical significance to the student. Wood's classification of the insanities is given, this section being up to the standard of the rest of the work. The book is well written, profusely illustrated, thoroughly indexed, and printed on an excellent grade of paper. The busy practitioner or student whose limited time precludes the use of more extensive treatises will find in this one of the best of the shorter works on this subject.   D. J. McC.

PROGRESS

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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The Etiology of Rheumatic Fever.—POYNTON and PAINE (*The Lancet*, September 22, 1900, p. 861, and September 29, 1900, p. 932) have isolated from eight successive cases of rheumatic fever a diplococcus which they believe to be a cause of rheumatic fever. They do not claim that the organism is constantly present in rheumatism, nor do they definitely assert that it is the only cause of the disease.

They first give a concise review of the literature on the bacteriology of rheumatic fever, including among others the important contributions of Chvostek, Singer, Achalme, Thiroloix, Griboulot, Westphal, and Wassermann. Granting that rheumatism is a microbic disease, the researches of the various investigators present a diversity of views.

The first view is that there is no specific organism, but that rheumatism is but a form of septicæmia which owes its origin to staphylococcal and streptococcal infection.

According to the second view a specific diplococcus is regarded as the cause of rheumatism. This is the view to which the authors adhere with some limitation to the term "specific."

The third view maintains that the cause is a specific bacillus. Achalme and his followers were supporters of this view.

The fourth view raises the question of a mixed infection of bacilli and cocci, an analogy to which is supplied by diphtheria.

According to the fifth view, rheumatic fever is not a disease sui generis, but a particular reaction of the tissues to varied infections.

Poynton and Paine commenced their investigation with the intention of confirming, if possible, Achalme's results. They were unable to obtain a

bacillus morphologically resembling the anthrax bacillus either in the cultures or in the tissues as Achalme had done.   On the contrary, they obtained in eight successive cases a diplococcus which grew in liquid media in streptococcal chains.   This organism is in the form of minute cocci associated in pairs, the individual elements of which vary somewhat in size but average 0.5μ in diameter.   In liquid media they grow in chains of varying length ; in solid media in masses that resemble the arrangement of staphylococci. The organism grows both aërobically and anaërobically, but better in the latter way.   It grows best in a medium of milk and bouillon slightly acidified with lactic acid.   The cocci stain with the various aniline dyes, but are easily decolorized by Gram's method.

This organism was isolated in eight successive cases of acute rheumatism. It was present in pure culture in five cases.   It was obtained (a) from the blood of living patients suffering from acute rheumatic pericarditis ; (b) from the pericardial fluid and from the fragments of granulations removed from the valves after death, and (c) from the throat of living patients suffering from rheumatic pericarditis.   The organism was isolated in pure culture from the joint exudation, heart-blood, urine from the bladder, and cerebrospinal fluid of rabbits that had been inoculated with a sufficient dosage. They have demonstrated the diplococcus in the cardiac valves, pericardium, and tonsils, and in a nodule in fatal cases of rheumatism.   They also demonstrated it in the cardiac valves, pericardium, joint exudation, kidneys, liver, connective tissues, pleuræ, cerebro-spinal fluid, lungs, and urine of rabbits inoculated intravenously.

The changes in the rabbit following the intravenous injection of this organism are very suggestive of its close relationship with the etiology of rheumatic fever.   It produces a polyarthritis, bursitis, and tenosynovitis. The polyarthritis may completely disappear.   Where the arthritis persists the joint effusion becomes turbid with fibrin and cellular elements ; in other cases the joint effusion is clear.   It causes a multiple valvulitis and pericarditis, both non-suppurative.   It produces plastic pleurisy and pneumonia and a fatty degeneration and destruction of the muscle fibres of the myocardium similar to that found in the human heart in severe rheumatic carditis.   It has not led to suppurative foci in the viscera.   The urine is acid and loaded with urates.   The clinical symptoms are characterized by multiple painful joint swellings, wasting, and moderate pyrexia.

Poynton and Paine, in discussing the point whether this organism is the cause of rheumatic fever, say that, in the face of the researches of several competent observers, they cannot claim that this diplococcus is the only cause of rheumatic fever.   That it is one cause they think they have proved to all practical purposes by their investigations.   They further believe it highly probable that it will prove to be the cause of all cases of rheumatic fever which conform to the usual type of the disease, for the disease in man, as they state, is a very definite one, and therefore probably caused by a specific micro-organism.

Some Points about Post-diphtheritic Paralysis.—MEYER (*The Lancet*, September 22, 1900, p. 869) made an analysis of the cases of diphtheria admitted to the Park Hospital, London, in 1899, in which paralysis or paresis

developed as a sequel. There were 1316 cases of diphtheria admitted to the wards. Of these, 275 developed post-diphtheritic paralysis or paresis ; in other words, about one-fifth of the cases. There were 147 cases in males and 128 in females. As the numbers of males and females admitted were about equal, the records show that paralysis was commoner in the former. Of those who suffered from paralysis there were 80 deaths (29 per cent.), 44 occurring in males (55 per cent.) and 36 in females (45 per cent.).

Cardiac paralysis was the cause of death in the largest percentage of cases. It caused death in 64 of the 80 fatal cases, or in 80 per cent. The great proportion of cases in which cardiac paralysis developed was in children between two and nine years, the majority being in the sixth to seventh year. After nine years of age there was a great falling off in these cases. The average date on which symptoms of cardiac paralysis appeared after the onset of the disease was the seventh day, the extremes being the first and thirty-sixth day. The average duration of life after symptoms of cardiac paralysis were first noted was the seventh day.

Diaphragmatic paralysis or paresis was present in 21, or 7.6 per cent., of the 275 cases. Of these, 11 cases terminated fatally. With only one or two exceptions the diaphragmatic paralysis was associated with paralysis of some other muscles.

There were 110 cases where the palate was alone affected, or 40 per cent. of the total number of cases. Counting the cases in which it was affected alone or in association with other muscles there were in all 166 cases, or 60 per cent., of the total.

Other muscles less frequently involved but in which the percentages are given were the ciliary, internal and external recti, facial, laryngeal, and muscles of deglutition.

It is to be regretted that no reference is made to the form of treatment of diphtheria carried out, and no statement is made concerning the effect that antitoxin had on the subsequent development of paralysis.

Experimental Proof of the Mosquito-malaria Theory.—That malaria is transmitted from man to man by a particular species of mosquito is now accepted by all biologists and medical men who have given proper attention to the matter. Considerable skepticism is still found, however, in the ranks of the medical profession and among the general public. In order to convince these skeptics of the importance of the mosquito in transmitting malaria, MANSON was instrumental in having carried out, during the past summer, two most convincing experiments.

Grassi and Bignami had proven that the mosquito could transmit malaria from man to man. As their experiments were carried out in Rome, which is situated in the midst of a highly malarial district, there might be some ground for the objections of the skeptics. Manson's son, Mr. P. Thurburn Manson, of Guy's Hospital, volunteered to be the subject of the first experiment. He is twenty-three years of age, was born in China, and had gone to England at the age of three. Since then he had never been abroad and had never been in any district in England reputed to be malarious. Arrangements were made with Bignami and Bastianelli for relays of mosquitoes (anopheles) to be forwarded from Rome as soon as possible after they

had fed on patients suffering from benign tertian malaria. The first consignment arrived at the London School of Tropical Medicine on July 5th. Possibly one of these bit the subject of the experiment. Mosquitoes of a second consignment he allowed to bite him on August 29th, August 31st, September 2d, and September 4th. Of a third consignment, twenty-five bit him on September 10th and ten on September 12th. Manson remained perfectly well until September 13th, when headache, fever, general lassitude, and aching pains ensued. Fever continued on the 14th. On the 15th he felt chilly and his temperature rose to 103.6° F. On the 16th and 17th there were exacerbations of fever. The examination of the fresh blood on the latter two days showed typical tertian malarial parasites. Their presence was confirmed by several competent observers. Quinine was started on the 17th, and the fever and parasites promptly disappeared. The convincing nature of this experiment seems to require no comment.

In the second experiment a hut, constructed in London, was shipped to Italy and erected in the Roman Campagna at a spot where Dr. L. Sambon, who had gone to Italy in connection with this experiment, found that the permanent inhabitants all suffer from malarial cachexia, and where the field laborers who come from healthy parts of Italy to reap the crops after a time all contract malaria. Dr. Sambon, Dr. Low, Signor Terzi, and their two Italian servants entered on residence in the hut early in July. The only protection against mosquito bites and fever employed was mosquito-netting, wire screens on the doors and windows, and mosquito nets around their beds. During the day they went about the country quite freely. They were always careful to be indoors from sunset to sunrise. Up to September 21st, the date of Dr. Sambon's last letter to Dr. Manson, all five had remained in perfect health, while their neighbors were all ill with fever or had suffered malarial attacks. Whereas this experiment had not been completed, those carrying it out were fully convinced that protection from mosquito bites protects from malaria, and that protection from mosquito bites is perfectly compatible with active outdoor occupation during the day.

Manson states that these experiments and those of other investigators indicate that the practical solution of the malaria problem lies (1) in avoiding the neighborhood of native houses; (2) in the destruction, so far as practicable, of the breeding pools of anopheles, and principally (3) in protection from mosquito bites.—*The Lancet*, September 29, 1900, p. 923.

Diphtheritic Paralysis and Antitoxin.—The assertion has occasionally been made that cases of post-diphtheritic paralysis are more frequent now than they were in the days before diphtheria antitoxin. RANSOM, in Behring's laboratory at Marburg, carried out a series of experiments on guinea-pigs with diphtheria toxin and antitoxin with the object of ascertaining whether there was any experimental proof for these statements. It is generally held that the severer forms of diphtheria are most likely to be followed by paralysis, and Ransom states that post-diphtheritic paralysis may be really more common now, owing to the fact that more severe cases of diphtheria now recover as a result of the general adoption of the antitoxin treatment. The technique adopted cannot be here given, but Ransom's conclusions with the use of toxins 79A and 100 are as follows :

1. Paralysis may certainly be expected after intoxication with not less than one-fourth of the minimum dose. With doses between one-fourth and one-eighth paralyses occur, but are not constant, and below one-eighth no paralysis was noticed.

2. The larger the dose of toxin the severer will be the paralysis, if the animal survives long enough.

3. Neutralized mixtures of toxin and antitoxin containing only about one lethal dose or less do not appear to cause paralysis.

4. Antitoxin given fifteen to twenty-two hours after intoxication, with doses of toxin not greater than the lethal dose, exercises in large doses a mollifying influence on the subsequent paralysis. This influence is more evident with smaller doses of toxin than with such as are but little less than the minimum dose. Small doses of antitoxin have no evident effect in diminishing the paralysis.

5. Transferring these results to practice among human beings, we may expect liberal doses of antitoxin, given early in the illness, to influence favorably the subsequent paralysis, and this beneficial influence is likely to manifest itself not so much on the local paralyses (soft palate, etc.) as on such symptoms as failure of the heart. Severe cases are, however, likely to be followed by some paralysis in spite of even large doses of antitoxin.—*The Journal of Pathology and Bacteriology*, July, 1900, p. 397.

SURGERY.

UNDER THE CHARGE OF

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The Causes and Treatment of Movable Kidney.—MOULIN (*British Medical Journal*, March 10, 1900), in considering the causation of movable kidney, speaks as follows: The width of the lumbar recess is one of the penalties which have followed the assumption of the erect attitude. If the history of the development of the renal organs in the race as well as in the individual is worked out it is seen that originally they were distributed over the whole length of the head and body, and that by degrees, as their function became more specialized, they became concentrated together, until in their most perfect form they constitute a pair of organs which in the quadrupedal mammalia are placed in a position of the very greatest possible security.

They lie close to the spine, immediately under the vertebra, almost in the central axis, around which all movements of the trunk and limbs take place. They are buried in two deep and narrow recesses, protected by the lower ribs, and rest upon a horizontal sheet of fascia, which in turn rests on the peritoneal viscera. The slight degree of backward and forward movement which is necessitated by the action of the diaphragm takes place without the least risk ; but with the assumption of the erect attitude a great portion of this security is lost. The backward and forward movement is altered to movement upward or downward in the direction of the line of gravity. The peritoneal viscera and the supporting fascia lie in front and not below. The lumbar recesses, instead of being deep and narrow, become broad. The convexity forward of the lumbar spine helps to make them still more shallow. The pelvis, especially in the female sex, becomes wider, so that the lower end of the recess becomes more open, and then the development of right-handedness causes the transverse processes of the lumbar vertebræ, which lie under the floor of the lumbar recess, to rotate. From a position of the greatest safety the kidneys are placed in one from which all security is gone ; and it is no wonder that comparatively trivial causes —an increase in the weight of the organ without a corresponding increase in the bulk, a sudden, violent jerk, or a great lowering of the intra-abdominal pressure—can increase their normal range of mobility. The wonder is not that movable kidney occurs, but that it does not occur more often.

This accounts completely for the peculiar clinical distribution of movable kidney. It is certainly hereditary and common. It is present in women much more often than it is in men, and in women who have borne children more often than in those who have not, and it is much more common on the right side than on the left. None of the other reasons which have been assigned for this, such as the weight of the liver or the length of the renal vessels, deserve consideration.

In regard to treatment Moulin says : The choice lies between wearing an abdominal belt and nephrorrhaphy. In the author's experience it is only in the milder cases that the former succeeds, and then it must be combined with massage and exercises calculated to strengthen the abdominal muscles. A belt braces the viscera together and so steadies the displaced organ, but it cannot press the kidney back into its place or retain it there after it has been reduced if the patient stands upright and takes a deep breath. Pads are useless. For all cases in which there is manifest deformity of the lumbar region, associated with movable kidney, or in which there is real distress, even though the mobility attains no higher degree than the anti-version of Potain, he never hesitates to recommend nephrorrhaphy. In the former case it is advisable in order to save the kidney from hydronephrosis and other troubles. It is the most certain method of giving relief. He has never known it to fail, when properly carried out, if the symptoms have not already lasted so long as to produce an indelible impression upon the patient's nervous system.

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The Open or Operative Treatment of Fresh Fractures.—SCUDDER (*Boston Medical and Surgical Journal*, March 22, 1900) has made a careful study of the recent and remote results obtained in the treatment of fractures of

the lower extremity. In discussing these results he says: "The treatment of closed fractures has always been thought to be easy and simple. The tables are to-day being reversed; it is the simple fracture which to-day is found to be the most difficult to treat if the problem of treatment is fairly faced. Is there anything more difficult to treat satisfactorily than the simple oblique fracture of both bones of the leg above the ankle; than fracture of the surgical neck of the humerus, with or without displacement of the head of the bone; than fracture of the clavicle, with considerable displacement? Is the separation of the upper epiphysis of the humerus an easy lesion to treat satisfactorily? Instances may be multiplied until it is evident that each bone is frequently fractured in a way most difficult for easy and satisfactory treatment by existing methods.

"The Röntgen ray provides through the developed plate and fluoroscope accurate anatomical knowledge of the relative position of broken bones. The interpretation of the fracture seen through the fluoroscope and upon the plate must be made by one skilled in the art. The casual observer makes many errors in judgment, and misinterprets the conditions present. The exact conditions of exposure and position under which the skiagraph is taken must be known before even the trained interpreter can correctly make the diagnosis. The X-ray provides the means for an accurate diagnosis.

"The open treatment of fractures should be undertaken only after careful consideration of the health of the patient and under most rigid antiseptic and aseptic conditions possible. The open treatment of the fracture should be carried out only by a skilled and competent surgeon. It should not be done in the aged. It is an operation for young adults, particularly for the laboring man. Early massage and passive and active motion after four weeks are desirable in the treatment of the fracture after operation.

"It is impossible to determine which method of those in use to-day will prove effective until the fracture is exposed to view. That method in any given case is the best which preserves the alignment of the shafts of the bones.

"The difficulties of reducing fractures will become more and more apparent as the open treatment is more commonly used. It will be found that no one factor is the cause of the difficulty, but more often it is due to a shortening of all the soft parts of the limb about the fracture, occasioned by the hemorrhage into the tissues, by retraction of tissues which have been normally stretched after the fractures have no resistance offered to their reaction. This difficulty in reduction I have found to be more common than is generally supposed. A recognition of it as a cause will lead undoubtedly to the supplementing of splints by internal fixation in the treatment of many fractures.

"The ideal result to be aimed at after a fracture is union of the fracture without deformity and without impairment of the function of the limb, either immediately or remotely. The generally accepted methods of treating fractures do not give satisfactory results in many cases. There is need for a radical departure in the treatment of closed fractures. Anæsthesia and the X-ray afford the means of accurate diagnosis. Sepsis is practically abolished. From analogy in excisions and osteotomy, closed fractures of bone

may safely be treated by open incision. The cases reported in the litera-
ture, expressing the opinions of many surgeons, demonstrate that the open
method of treatment is satisfactory and a great advance upon generally
accepted methods.''

Fracture of the Metatarsal Bones by Indirect Violence.—LOISON (*Revue
de Orthopédie*, September 1, 1900), after reviewing the symptomatology, diag-
nosis, and treatment of thirty-two cases, notes the following conclusions:
(1) Complete or incomplete fractures of one or several of the metatarsal bones
are much less rare than is generally believed. (2) The X-rays are of the
greatest assistance in the diagnosis of incomplete fractures, in establishing
the form and exact situation of the fragments, and also the extent of the in-
jury in the complete and comminuted fractures. (3) Fractures of the meta-
tarsal bones as the result of indirect violence are due to either one of two
mechanical causes: exaggerated flexion in a vertical direction or in a trans-
verse direction. In some cases these two causes may be combined, the
causative traumatic force following an oblique direction.

**A Study of the X-ray Plates of One Hundred and Forty Cases of Frac-
ture of the Lower End of the Radius.**—CODMAN (*Boston Medical and Sur-
gical Journal*, September 27, 1900) states that Colles' fracture may be sepa-
rated into ten distinct types, according to the lines of cleavage and the
directions of the displacement. Class I. Fracture through the base of the
styloid process of the radius. The fragment is displaced but little—gener-
ally upward and backward by the supinator longus. Four cases are included
in this series. Class II. Fracture of the inner angle of the lower end of the
radius. The fragment either remains in place or may be dislocated back-
ward. This type includes three cases. Class III. Transverse fracture at or
a little above the epiphyseal line (in adults) without displacement. This
class includes sixteen cases. Class IV. The distal fragment is comminuted,
either as a simple T-fracture or into several smaller pieces. The fragments
are generally displaced posteriorly and radially, but part of them may go
anteriorly. In the thirteen reported cases all were complicated by fracture
of the styloid process of the ulna. Class V. Separation of the epiphysis of
the lower end of the radius. The cases, seventeen in number, presented
themselves with the fragments completely reduced, or else they had the
typical silver-fork deformity. Class VI. Separation of the epiphysis of the
lower end of the radius with a chip off the posterior surface of the diaphysis.
This class includes ten cases. Class VII. Impaction of lower fragment into
the shaft. Rare; only two of the 140 cases being found in this class. Class
VIII. Typical Colles' fracture, which may be divided into two forms: That
with marked radial displacement of the fragment and that in which the pos-
terior deformity is more decided. These two deformities are usually com-
bined to a greater or less extent. Of the 140 cases 64 are included in this
class. Class IX. Stellate fracture of the lower end of the radius, with longi-
tudinal fissures extending into the shaft. There is but slight deformity.
This class includes six cases. Class X. Reversed Colles' fracture—that is,

anterior displacement of the lower fragment. This is almost exactly the reverse of Class VIII., and five cases are included in this series. After describing the diagnosis and treatment of these various types of cases, Codman states in conclusion : (1) That true Colles' fracture formed but 46 per cent. of the 140 cases of fracture of the lower end of the radius. (2) That a knowledge of the position of the fragments is necessary for intelligent treatment. (3) That the application of padding and splints should vary according to the displacement shown in the skiagram. (4) That if the X-ray shows that marked deformity is still present after the splints have been applied, ether should be given and another energetic attempt at reduction made. (5) That concomitant fracture of the ulnar styloid occurred in at least 62 per cent. of the 140 cases, and if 39 cases in which this process was obscure in the skiagram are deducted, fracture occurred in 86 per cent. (6) That in Colles' fracture pressure over the anterior edge of the upper fragment should be avoided and cross traction should be used to correct the radial displacement of the lower fragment. (7) That statistics of the results of Colles' fracture are not of value unless the pathology of each case is determined by a skiagram.

The Treatment of Tuberculous and Purulent Joints with Large Glass-speculum Drainage and Pure Carbolic Acid, with a Report of Seventy Cases.—PHELPS (*New York Medical Journal*, September 15, 1900) states that the belief that interference with purulent or tuberculous foci will result in constitutional infection is not borne out by clinical observation, for he states that he has not only never seen it, but he does not believe that it ever occurs. There should be absolutely no difference between the treatment of abscesses of a joint and that of an abscess occurring in any portion of bone or in soft parts. As pure carbolic acid cannot be absorbed it is of interest to see how it reaches the bacteria that have found their way into the lymphatics remote from the joint. The explanation is founded on the theory that carbolic acid unites with the albumin of the tissues, forming an albuminoid or albuminate which is a powerful antiseptic. This new compound is absorbed into the lymphatics and destroys the bacteria. The method of application consists in exposing the abscess cavity by a free incision, then enlarging the opening into the capsule and explore the joint. If there is extensive bone disease the incision is lengthened and the capsule of the joint freely divided for one-half or two-thirds of its entire circumference, the head of the bone pulled out from the socket, the curette freely used, and the joint thoroughly irrigated with a 1 : 1000 bichloride solution. The joint is now filled with pure carbolic acid. It is allowed to remain one minute by the watch, after which the joint is thoroughly washed out with pure alcohol, and finally the alcohol is washed away with a 2 per cent. solution of carbolic acid. The largest size glass drainage-tube that the cavity will take is then introduced and is retained in place until granulations fill in from the bottom of the wound. The results have been uniformly good. Twenty of the seventy operations were excisions, and these patients were discharged from the hospital in an average of three weeks from the time of operation, wearing hip braces or using crutches.

PEDIATRICS.

UNDER THE CHARGE OF

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The Premonitory Stage of Scarlatinal Nephritis.—In a valuable contribution to the subject of the treatment of scarlatinal nephritis, ROBERT COLEMAN KEMP, of New York (*Pediatrics*, October 1, 1900, p. 241), devotes a section to the urinary indications of the premonitory stage of the renal complication.

1. The first symptom often noted is, as a rule, a fall in specific gravity, without, as yet, the appearance of casts, blood, albumin, or, as a rule, rise of temperature. Anasarca, as a rule, does not appear at this stage of the disease. This symptom, which was first called to the author's attention by Dr. William H. Thomson, of New York, has been observed in many cases without polyuria and without albuminuria, yet in some with commencing anasarca associated with it. Other observers speak only of a fall in specific gravity as a primary symptom and as invariably associated with polyuria, and more or less frequent micturition and irritability of the bladder. The specific gravity should, therefore, be accurately taken at least twice a day from the middle of the second week, and the daily quantity of urine should be measured. Active treatment should be begun the instant a fall in specific gravity is observed.

2. The next symptom following the fall in specific gravity is a sudden rise, becoming abnormally high. The urine is diminished in quantity and is high-colored. Frequently these are the first symptoms noted by the physician, no preliminary fall of specific gravity occurring. As a rule, there is yet no albumin, usually no anasarca, and no exacerbation of temperature, a certain degree of fever generally existing at the time, attributable to other causes.

These signs are especially significant during the period from the second to the fourth week, denoting an engorgement of the renal vessels, and call for active treatment. Occasionally there may be a trace of albumin and a slight rise of temperature, or even a slight anasarca coincident with the above symptoms.

3. The increase of urates, especially with an accompanying slight rise of temperature, especially in the third or fourth weeks of scarlatina, though without albumin, is indicative of a commencing nephritis.

4. As a rule, a period of perfectly normal urine intermits before the development of nephritis. This is the experience of Forchheimer.

[The importance of systematic observation of the specific gravity of the urine during the later weeks of isolation, as pointed out by the author, can-

not be too strongly emphasized. The nurse should, therefore, be instructed in the use of the urinometer in the sick-room, and two daily observations should be recorded with the same regularity as is practised with pulse, temperature, and respiration records.—ED.]

Hysteria in Boys and Youths.—ARTHUR HALL (*The Quarterly Medical Journal*, August, 1900) reports a series of interesting cases illustrating the great danger of mistaking hysteria for organic disease, especially when the patient is a boy.

Case I., a boy, aged nine years, was first afflicted five weeks before observation. He had complained of pain in the legs on returning from school, and two weeks later he began to stagger so that he nearly fell into the fire. Since then he had steadily grown worse, his gait resembling that of cerebellar disease. He lay curled up in bed, objecting to both light and interference. The muscles of the legs and thighs were well developed and firm, with good power, no anæsthesia, complete control of sphincters, and normal reflexes. Perfect cure resulted after an exhibition of the faradic battery and its threatened use.

Case II. was observed in a boy, aged thirteen years, who thirteen days before consultation had sustained a blow upon the frontal region of the head from a falling box. No external lesion had been produced. The same day he had a fit, and continued to have two or three a day since. There was no vomiting; photophobia was complained of; but there was no paralysis, no anæsthesia, and knee-jerks were increased. The ocular fundi were normal. The "boiling-water" treatment during a very characteristic hysterical attack was very successful. In this expedient boiling water is loudly called for; cold is supplied, and, if necessary, is sprinkled on the brow.

Several other cases are recorded, two simulating cerebral tumor, in a boy of nine years and a youth of eighteen years respectively; one simulating meningitis (fifteen years), one simulating Jacksonian epilepsy (twenty-one years), and one simulating a lightning stroke (a youth).

In conclusion, the author remarks that the most striking difference between the hysterical boy and the hysterical girl is that the former apparently does it much more purposely, the difference being partly due to the difference in surroundings of the two. The boy has to live among boys, and knows how his fellows would tease him for any "girlish" tricks, hence he dreads discovery, and "plays the game" with greater thoroughness.

Abdominal Symptoms in the Pneumonia of Children —J. L. MORSE, of Boston (*Annals of Gynecology and Pediatry*, November, 1899), calls attention to the danger of mistaking a case of so-called abdominal pneumonia in children for one involving the abdominal organs and demanding operative relief. He reports that he has seen two cases in which the abdomen was opened by experienced surgeons, because appendicitis and not pneumonia was supposed to be the cause of the trouble. In such cases physical signs in the lungs may not be recognizable for several days. In the absence of physical signs the combination of symptoms should arouse suspicion of the real seat of the disease. With an acute onset, with high temperature and the rate of respiration increased out of proportion to that of the pulse, even

in absence of a cough, the probability of pneumonia is decided. This disturbance of the ratio of pulse, temperature, and respiration should enable one to avoid error, even when abdominal pain, constipation, and at times also tenderness and distention, probably of reflex origin, are present. Of the illustrative cases one is quite noteworthy, since the history showed previous constipation and a blow upon the abdomen shortly before the onset of the acute symptoms.

Acute Dilatation of the Heart in Influenza of Children.—F. FORCH-HEIMER, of Cincinnati (*Jacobi's Festschrift*, May 6, 1900, p. 127), calls attention to the frequency of acute dilatation of the heart in this disease as especially observed in childhood. He describes two classes of cases, differing essentially in the gravity of their symptoms. In the milder cases within twelve to twenty-four hours of the onset, with high fever accompanied by respiratory or gastro-intestinal symptoms, there develops dyspnœa, or, better, tachypnœa, since all other evidences of dyspnœa are wanting, such as cyanosis and movements of the accessory respiratory muscles. The child lies in bed, with congested skin, sleeps a great deal, yet is easily aroused; the tachypnœa is represented by rapid breathing (60 or 70 or more respirations per minute), without disturbance of the normal relation between inspiration and expiration. In some cases the breathing is not very much more rapid than normal. The pulse is very rapid, depending upon the age of the patient, frequently intermittent, but otherwise normal. Physical examination of the chest reveals nothing, or, possibly, only evidences of a bronchitis in the large tubes. The heart dulness is always found broadened, with no bruit as a symptom of this affection. The urine contains no albumin. In the course of from twenty-four to seventy-two hours all these symptoms disappear—the temperature, pulse, heart, and respiration become normal. After discussing the various theories as to the etiology of this condition the author inclines to agree with Sansom, that there is some affection of the bulb involving both the respiratory and the cardiac accelerating centres. The source of this irritation would be a toxin, hypothetical as far as the influenza bacillus is concerned, but positive as to some of the pus producers which habitually accompany influenza. It would be fully in accord with the nervous origin of these symptoms that broadening of the heart's dulness is found. The production of acute dilatation of the heart as the result of disturbance in innervation has been conclusively proven in many diseases.

The grave form of the affection presents an entirely different clinical picture. Of this Huchard gives the following concise description: "The attack manifests itself by syncope and faintness, which may become fatal, by slow pulse, by arrhythmia, or intermittence, by grave symptoms of cardiac collapse, and sometimes by pains resembling angina pectoris."

The dominant symptoms in all the cases among children seen by the author were the acute dilatation and the peculiar respiration which he has seen only in two other conditions—in pericardial effusion and the fugitive œdematous condition of lung that frequently precedes pneumonic consolidation in influenza without cardiac changes. According to his observation, one is justified in assuming two forms of dilatation of the heart in influenza: one presumably produced by the action of the toxin upon the nervous sys-

tem of the heart, and possibly upon the myocardium; the second form occurring in such conditions in which outflow of blood is materially interfered with on account of mechanical conditions. The first form, according to the observations of West, undoubtedly may end fatally, although this has not been the case in the author's own experience. The second form is one that lasts much longer than the first, but in children has a tendency to recovery.

THERAPEUTICS.

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The Treatment of Furunculosis.—DR. GUSTAV LONGMANN applies the cathode, which exhibits more intense reaction upon the tissue. It is placed upon the furuncle, the anode somewhere in the neighborhood, and a current of about 2 to 5 milliampères is applied for from five to ten minutes. As a rule, one sitting daily is sufficient. The intensity of the current ought to vary both with the stage of development of the boil (the earlier stages being more sensitive) and with individual sensitiveness. Whenever there is extensive suppuration a flat pledget of cotton soaked in a 1:1000 solution of corrosive sublimate is placed between the sponge and the skin. Whether this powerful antiseptic has a beneficial cataphoric action or not is not certain, but those who have great confidence in cataphoresis may use it on all boils. Under this treatment some boils disappear after one or two applications; others may require as many as eight; on the average four or five sittings terminate their existence.—*New York Medical Journal*, 1900, No. 1122, p. 854.

Chronic Brass Poisoning.—DR. WILLIAM MURRAY remarks that while the condition is far from infrequent, the literature is surprisingly scanty and unsatisfying. Potassium iodide did not give satisfactory results in spite of Simons' enthusiastic indorsement. Remembering that copper sulphate is recognized as an antidote for phosphorus poisoning, pills containing the latter in doses as large as one-tenth of a grain daily were administered, with excellent results. The patients became rapidly well, even if they did not desist from their work. Diluted phosphoric acid, fifteen minims three times daily, gave even better results; the explanation being, apparently, that phosphorus when injected becomes converted partly into phosphoric acid, and it may be that only this part is effectual, so that a certain amount of economy is exercised in giving the acid direct. Sometimes, however, better results were obtained with the phosphorus. The only matter of diet which

need be considered is the importance of milk as a beverage.—*British Medical Journal*, 1900, No. 2057, p. 1334.

The Untoward Action of Citrophen.—DR. ERNST SCHOTTEN was treating a young woman for acute rheumatic polyarthritis with sodium salicylate, which produced ear symptoms and vomiting. Immediately on commencing with citrophen in fifteen-grain doses thrice daily there supervened headache, hot flashes, singing in the ears, and profuse perspiration. On the following day cyanosis appeared. Neither at this nor other times was the pain markedly diminished. On omitting the drug these symptoms disappeared.—*Therapeutische Monatshefte*, 1900, Heft v., S. 278.

The Action of Chloroform upon the Blood.—DOTT. V. BACCARANI presents the following interesting results : (1) The specific gravity of the blood is not altered in mild narcosis ; in some species of animals it is increased, in others diminished by protracted and profound narcosis. (2) Its alkalinity is slightly diminished. (3) The number of red corpuscles is diminished, but not always in a given proportion. (4) The number of white corpuscles is increased, particularly in the peripheral bloodvessels. (5) There is no appreciable change in the percentage of hæmoglobin when measured by the Fleischl apparatus. (6) Arterial blood shows the absorption-band of methæmoglobin. (7) The bactericidal properties are increased (8) It furnishes the respiratory power of the red blood-cells (9) Venous blood reacts more readily and more markedly to chloroform. (10) The red blood-cells of youth are more profoundly changed than those of adults. (11) Death may occur in animals without notable change in the blood. (12) The action of chloroform may persist for several hours, or even days.—*Gazetta degli Ospedali e delle Cliniche*, 1900, No. 42, S. 445.

The Treatment of Articular Rheumatism.—DOTT. F. BATTISTINI, while regarding the salicylates as the most trustworthy remedies, is not insensible to their disadvantages. Better known, and at the same time inconveniences of minor importance, are digestive disturbances, varying from heaviness in the stomach to nausea and vomiting. Various exanthemata, morbilliform and scarlatiniform erythema, erythema nodosum, urticaria, vesicular pemphigoid eruptions, and, rarely, in marasmic individuals, purpura may appear. Hyperidrosis is noted in about 68 per cent. of patients. Hemorrhage is of comparatively recent occurrence with sodium salicylate—epistaxis, hæmaturia, entorrhagia, metrorrhagia, and menorrhagia. Various nervous symptoms have been observed, notably delirium. Dyspnœa merits especial attention, and is produced by direct action on the respiratory centres. Symptoms referable to audition occur in about 60 per cent. of urticarias. For diminishing the last ergot or ergotin have been proposed, but do not give satisfactory results. For preventing gastric disturbance weak solutions of the remedy should be employed, or alcohol added in small quantity ; or the remedy may be associated with sodium bicarbonate or Vichy and given apart from the meals. Many instances of intolerance can be circumvented by rectal administration, high enema, well diluted, and with a small amount of tincture of opium.—*Rivista Critica di Clinica Medica*, 1900, No. 17, p. 331.

Acetanilid Poisoning.—DR. O. R. SUMMERS reports a patient who was given four grains and the dose repeated in thirty minutes. There was no cardiac lesion; the patient suffered from temporary frontal headache. Twenty minutes after the second powder was taken there developed nausea and giddiness. Headache suddenly ceased; respiration became very difficult, 35 to the minute; pulse, 140; temperature, 95° F.; cyanosis of lips and fingers; cold extremities; dilated pupils; cold perspiration; convulsive movements; partial loss of consciousness; retching. Whiskey and strychnine nitrate were given; artificial respiration was practised for nearly two hours. The patient rallied, but relapsed and nearly died. Renewal of the above treatment again caused improvement in her condition and complete recovery ensued. For four days she was confined to bed, with slight fever and considerable vertigo. It is of importance to note that the patient had taken much larger doses of acetanilid many times with no ill effects, showing that there was no idiosyncrasy for the drug.—*New York Medical Journal,* 1900, vol. lxxi., p. 426.

Treatment of Scarlatinal Nephritis.—DR. ROBERT COLEMAN KEMP recommends amyl nitrite by inhalation for uræmic convulsions. As regards the use of oxygen in pulmonary conditions due to nephritis may be cited pulmonary œdema, pulmonary congestion, or pleurisy with effusion due to oliguria, as sufficient examples The early use of this agent is the keynote of success, for it will dilate the bronchioles, improve the respiratory functions, and also the pulmonary and general circulation. Such results must diminish the chances of further extension of the morbid processes, and aid the absorption of those products if already present. As an aid to the elimination of toxins, it improves the condition of the red blood-cells and the secretory functions. One of the most valuable agents is normal saline solution. Enteroclysis at 110° to 120° F. with this solution for fifteen minutes to an hour continuously, depending upon indications, and as frequently as three or four times daily in oliguria, uræmic convulsions, uræmic coma, dropsy, suppression of urine, pulmonary œdema, pleurisy with effusion, gives satisfactory results.—*Pediatrics,* 1900, vol. x., pp. 241, 281.

Anthrax Successfully Treated by Local Injections of Pure Carbolic Acid.—DR. W. E. FISHER reports a single instance in which one drachm of a 10 per cent. solution of carbolic acid was injected into and around the eschar of a punctured wound on the forearm, received eight days before the patient came under observation. Injections of one drachm of pure carbolic acid were repeated on the following days until six, in all, were given. After three injections the temperature fell to normal, and after five the eschar ceased to spread. At no time was carbolic acid detected in the urine. —*Therapeutic Gazette,* 1900, No. 8, p. 508.

Tansy.—DOTT. NICOLA LANZA has made a laboratory study of this plant. The following conclusions are presented: 1. In frogs after injection of small or moderate doses of the essence of tansy there is, first, a temporary period of excitement, due in part to the local irritant action of the drug,

then follows a progressive weakening of motor power, and finally a complete loss of voluntary movement and a diminution of the reflexes. With large doses there comes a period of excitement, followed by complete loss of motion and sensation, paralysis, muscular resolution, and death. 2. In guinea-pigs and rabbits, with small and medium doses, tremors, hyperæsthesia and diminution of voluntary movements follow. With large doses we have first isolated spasms of the muscles of the face, thorax, and anterior extremities, then general tonic-clonic convulsions, loss of voluntary movement, and death. 3. In rabbits are observed the classical *rabies tanacetica* of Peyraud—grinding the teeth, attempts to bite the foot, and chewing their paws. 4. In dogs after subcutaneous injection of small or moderate doses there follow local irritation, renal irritation, with bloody urine, and tremors. With large doses these symptoms are accentuated with consecutive paralysis. 5. After intravenous injection follow convulsive attacks, at first tonic, but later tonic-clonic, paralysis, coma, and death. 6. In dogs the paralytic form of tansy-rabies prevails. 7. In pigeons small doses produce a temporary excitement; large ones, general tonic-clonic convulsions, and death by asphyxia.—*Gazetta degli Ospedali e delle Cliniche*, 1900, No. 9, p 81.

The Electrostatic Treatment of Paralysis.—DR. WILLIAM BENHAM SNOW summarizes as follows : 1. In an instance of paralysis the nutrition of the parts should be maintained by an agency which will preserve the balance of the nutrition of exercise and the nutrition of restoration, that degeneration may be retarded. 2. Such agents must be searching, potent, and of a character which will induce no chemical or unfavorable alterative action of the tissues. 3. Use electrostatic sparks and currents, having high voltage and infinitesimal quantity or ampèrage, exercise the parts, promote metabolism, and, when systematically applied, thereby one maintains the parts in the best condition. 4. When the character of the lesion does not preclude the possibility of recovery, early treatment will prevent degeneration, hasten recovery, and give excellent final results. 5. There is not any contraindication, at any state of a paralysis, to the intelligent administration of electrostatic treatment, because it lessens hyperæmia and congestion, relieves nervous irritation, and tends to restore the normal equilibrium of the system in general and of the parts affected.—*The Post-Graduate*, 1900, No. 3, p. 358.

Night-terrors.—DR. FRANCIS HUBER would proscribe threats, ghost stories, goblins, giants, the usual thrilling nursery literature, exciting games, and dark or poorly-ventilated rooms. Heavy, indigestible meals at night and the use of tea, coffee, or alcohol in any form favor the occurrence of this symptom in those predisposed. The causes being varied, each patient must be studied. The mode of life must be investigated, the habits inquired into, nervous or mental strain avoided, and the influence of parents, companions, and attendants subjected to close inquiry. The literature, games, and diet are worthy of attention. Pale, anæmic, and weakly children must be strengthened by tonic treatment. The presence of some person in an adjoining room and a dim light may increase the confidence of the child. In neuropathic children the bromides or chloral may render good service.—*Pediatrics*, 1900, No. 7, p. 279.

GYNECOLOGY.

UNDER THE CHARGE OF

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Separation of the Corpus Uteri.—LUDWIG (*Centralblatt für Gynäkologie*, 1900, No. 25) reports a case of ovariotomy in a child, twelve years of age, in which the uterus was found to be absent from its usual site. After a search it was found to be drawn upward and attached to a dermoid cyst, a thin band of tissue being traced downward to the vaginal vault. The organ was well developed, the tubes occupying their normal relations to the cornua. The cervical canal was obliterated, though the corporeal cavity was of the usual size. On vaginal examination a small portion was found with a canal 3 mm. in length. It was evident that the body of the uterus had been gradually separated from the cervix by upward traction made by the growing cyst.

Implantation of the Fallopian Tube in the Uterus.—SCHMIT (*Centralblatt für Gynäkologie*, 1900, No. 25) in performing a cœliotomy for tubal pregnancy, found the ovary normal, while at the proximal end of the tube was a small fibroma which apparently closed its lumen. In order to prevent subsequent sterility or a possible second tubal gestation, the operator excised the affected portion of the tube and implanted the end in the uterine cavity. The patient made an uninterrupted recovery.

Etiology of Uterine Fibromyomata.—MÖLLER (*Centralblatt für Gynäkologie*, 1900, No. 25) discusses at length the two theories with regard to the etiology of these growths, viz., that they are due to local irritation, or that they are due to prenatal causes. From an analysis of a large number of clinical cases he finds that 32.8 per cent. of the patients were virgins, and 67.2 per cent. were not. About one-half of the latter were sterile. Heredity seemed to play quite an important part. In his microscopical studies the writer often found myomata the size of a pin's head, which were separated from the uterine muscle by a distinct layer of connective tissue. Small arteries could be traced into the periphery of the interstitial growths from the surrounding tissues. The vessels possessed the usual three coats, though the intima and media eventually disappeared. The muscle-cells in the vessel walls remained distinct from those of the myoma, which the writer believes is an argument against the theory that these growths may originate from the muscular elements of the bloodvessels. Personally, he believes that they may be produced by local irritation in a subject with a predisposition to these tumors.

Restitution of the Pelvic Floor.—OTT (*Centralblatt für Gynäkologie*, 1900, No. 28) describes the following method of operation in a case of prolapse of the rectum due to complete atrophy of the muscles of the pelvic floor, in-

cluding the sphincter ani. The skin carrying the perineum was dissected off, after which a denudation was made similar to that in cases of complete laceration. The sutures were passed in such a way that the lower portion of the rectum was narrowed and somewhat lengthened. The operation was entirely successful, and an examination at the end of three weeks showed that the normal tone of the pelvic floor had been restored, and that a firm, elastic sphincter muscle was present.

Results of Vagino-fixation.—KAUFFMANN (*Zeitschrift für Geb. u. Gynäkologie,* Band xlii., Heft 1) reports the subsequent condition of 103 patients upon whom this operation had been performed at the Berlin Clinic. In all but three, plastic operations upon the vagina and pelvic floor were done at the same time. Only such cases were treated surgically as could not be relieved by pessaries. The periods after operation varied from eight months to four years.

In eleven cases the retroversion recurred, but in only one of these had the peritoneal cavity been opened. The fact that prolapse of the vagina was almost invariably present led to the inference that the uterine displacement followed the sagging of the vaginal walls. Five patients became pregnant after the operation, four being delivered at full term. All but seventeen of the patients had passed the age of child-bearing. The writer emphasizes the importance of limiting vagino-fixation as far as possible to such cases, and believes that shortening of the round ligaments or ventro-suspension should be preferred in women who are not near the climacteric. Plastic operations should always be performed at the same time if the vagina is relaxed.

Displacements and Chronic Disease of the Adnexa due to Physical Strain.—FÜRST (*Sammlung klin. Vorträge,* No. 253) states that retroversion is favored by a moderate increase in the intra-abdominal pressure, if the latter is more or less constant. Seamstresses are peculiarly liable to this condition, as well as young girls who are obliged to sit for long periods in an unnatural position while studying. Excessive cycling is also a frequent cause. Women whose occupations favor a continued diminution of the intra-abdominal pressure, such as scrub- and washerwomen, seem to possess a certain immunity. The writer advises patients with a tendency to retrodisplacement to assume the knee-chest position for at least ten minutes daily. Disease of the adnexa is favored by constant severe muscular efforts, such as carrying burdens or running heavy sewing machines. The greater frequency of parametritis in the left side he attributes to the more frequent use of the right arm, which causes the intra-abdominal pressure to be exerted toward the left side of the pelvis.

The Clinical Significance of Movable Retroversion.—KRÖNIG and FENCHTWANGER (*Monatschrift für Geb. u. Gyn.; Centralblatt für Gynäkologie,* 1900, No. 28) analyzed a series of cases of anteflexion and retroflexion, with the view of determining which displacement occasioned the more severe symptoms. 103 cases of the former and 33 of the latter were kept under observation, 44 per cent. of the women with anteflexion and 40 per cent., or

those with retroflexion, complained of practically the same troubles, which seemed to show that the position of the uterus has little to do with the symptoms. Hysteria seemed to be the most frequent one in retroflexion, but the relation did not appear to be close. A further study of cases in which the displacement had been curetted by pessaries or operations also seemed to bear out the conclusion that the persistence of the symptoms was not due directly to the better position of the uterus. The authors infer that cases of movable retroversion with attendant nervous symptoms are really subjects for medical treatment.

Precautions after Narcosis.—BLUMFELD (*Lancet; Centralblatt für Gynäkologie*, 1900, No. 28) makes the following valuable suggestions, which are especially applicable to cases of abdominal section : 1. At the conclusion of the operation the stomach should be washed out if the patient has swallowed considerable mucus. 2. If an operation has continued beyond three-quarters of an hour ether should be substituted for chloroform. 3. The patient should be moved as little as possible during and after operation. 4. She should be placed upon the right side. 5. Nothing but small quantities of hot water should be given for at least eight hours. 6. The temperature of the room should remain the same for several hours. By observing these precautions the writer found that in 572 narcoses one-third of the patients remained entirely free from unpleasant after-effects.

Tympanites as a Diagnostic Sign.—BAYER (*Prager med. Wochenschrift*, 1899, Nos. 25, 26, and 28) believes that the character of the tympanites in a given case gives a clew to the location of the obstruction in the intestinal tract. He distinguishes the following types : 1. Dilatation of the stomach due to pyloric stenosis, which in obscure cases may be accentuated by artificial distention of the organ. 2. Stenosis of the duodenum, in which there is constant vomiting of bile without symptoms of ileus. 3. Distention of the whole epigastrium, with flattening of the lower abdomen and ileus, points to obstruction of the upper portion of the small intestine; in some cases the tension is suddenly relaxed after severe retching. 4. Prominence of the umbilical region, with depressed flanks, is indicative of stenosis at Bauhin's valve. 5. Obstruction low down in the large intestine is attended with distention in the flanks and broadening of the lower abdomen; if higher up the distention of the colon is partial or asymmetrical. The greatest tension in the cæcal region occurs in cases in which the obstruction is below this point. The writer adds that these typical forms of meteorismus are only valuable for diagnosis so long as the peristaltic movements still persist. The diagnosis becomes more difficult in general paralysis of the gut due to peritonitis. Errors may easily arise when coils of adherent intestine are so situated as to resemble neoplasms ; also in fecal impaction.

Superficial adhesions are attended with the frequent development and rapid disappearance of painful sausage-shaped swellings accompanied by cramp-like pains.

Multiple stenoses offer the greatest difficulties.

OBSTETRICS.

UNDER THE CHARGE OF

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The Influence of Narcosis by Chloroform upon the Pains of Labor.—
WESTERMARK publishes in the *Archiv für Gynäkologie*, 1900, Band lxi.
Heft 1, the reports of a series of elaborate experiments to determine the
influence of chloroform upon the action of the uterus during labor.   These
experiments were conducted in Stockholm, and are of great interest.   He
concludes that complete narcosis by chloroform diminishes the frequency
of uterine contractions and lengthens the interval between the pains.   It
exercises no influence upon the intra-uterine pressure between the pains,
but renders uterine contractions shorter in duration.   The intra-uterine
pressure is lengthened during the pain under the full influence of chloro-
form.   The pain reaches its highest point in practically the same time as in
cases where chloroform is not given.   Obstetric anæsthesia with chloroform
lessens the frequency of the pains.   It lengthens the interval between them,
exercises no influence upon the intra-uterine pressure during the pains, but
greatly diminishes the suffering which the pains occasion.   In a small de-
gree obstetric anæsthesia with chloroform lessens the duration of the pains.
It does not, however, diminish the intra-uterine pressure.   The highest
point of the pain is reached in about the same time with or without obstetric
anæsthesia.   The practical conclusion of his experiments is that the use of
chloroform in obstetrics should be limited to those cases where the suffering
is intense and the control of the patient becomes so necessary that it seems
best to risk some prolongation of the labor in order to control them.

The Notification of Cases of Puerperal Fever.—At the recent meeting
of the British Medical Association, BERRY HART (*British Medical Journal*,
1900, No. 2072) read a paper upon the subject of puerperal fever, of which
he distinguished three forms.   The first is the acute and rapid form, where
a large amount of poison is directly absorbed, either through extensive
lacerations or through the retention of placental or membranous tissue.   In
these cases the pulse may be high while the temperature is low, and the
patient has the intoxicated appearance which indicates the gravity of the
condition.

The second form is the ordinary one, where the pulse and temperature
rise within the first five days, with rigors and invasion of the peritoneum,
pericardium, or endocardium.   A large number of these cases recover with
appropriate antiseptic treatment.

The third variety, sometimes called the venous form, is that in which
thrombi become infected and infected material is carried extensively through

the circulation. Pyæmia subsequently develops. In addition to these we see gonorrhœal cases and puerperal tetanus, caused by the tetanus bacillus.

It is urged that these cases be reported to the authorities, just as scarlatina, diphtheria, and other contagious and infectious maladies are reported. It is hoped by this means that puerperal fever may be reduced in frequency, and that important statistics may be gathered which will throw new light upon this disorder.

Cœliohysterectomy for Contracted Pelvis.—In the *Scottish Medical and Surgical Journal*, September, 1900, BREWIS reports the case of a patient whom he saw in labor and in whose case craniotomy was performed. The patient recovered and subsequently became pregnant again. She had a symmetrically contracted pelvis of a high degree of contraction. She assented to any operation which would save her child and would spare her the possibility of further pregnancy. Accordingly, the child was extracted by Cæsarean operation. The ovarian arteries and vessels accompanying the round ligaments were tied and the broad ligaments divided. A peritoneal flap in the lower part of the uterus was pushed down along with the bladder. The uterine arteries were then secured and the body of the uterus was removed. The stump was sutured and covered by peritoneal flaps. The patient made an excellent recovery.

Cephalotripsy for the Aftercoming Head.—At the last meeting of the British Medical Association, TARGETT described the case of a patient, aged twenty-nine years, a rhachitic dwarf. The pelvis was highly contracted, the true conjugate not exceeding two and three-quarter inches. The patient declined to submit to Cæsarean section, and labor was induced. There was entire lack of action on the part of the uterus. Dilatation was performed by elastic bags, version was done, and the breech brought down into the cervix, but without exciting uterine contractions. It became necessary to deliver, when it was found that the head could not pass through the brim. The occiput pointed to the right, and the face was to the left, and flexion was well performed by traction upon the jaw, yet delivery could not be accomplished. Accordingly, the head was perforated in the suboccipital region. The lower blade of the cephalotribe was then applied over the face, but it was impossible to pass the upper blade over the occiput. Accordingly, the upper blade was passed through the suboccipital perforation and the head crushed. The occiput was rotated in front and the head delivered without further difficulty. The patient made a good recovery.

He also described a case in which perforation and cephalotripsy had been performed, but the head was high in the pelvic cavity and the trunk would not enter the brim. Internal version was performed and the child extracted with difficulty.

In the discussion others related cases in which version after craniotomy was most successful.—*British Medical Journal*, 1900, No 2072.

The Second Stage in the Formation of the Human Placenta.—In the *British Medical Journal*, 1900, No. 2072, TUSSENBROEK gives the following results from her investigations in this subject. The macroscopical form of

the placenta is completed about the sixth month of pregnancy. At that
period the decidua reflexa has almost totally disappeared. The reduction
of the decidua reflexa is the effect of mechanical pressure. The villi of the
chorion, which disappear, are removed chiefly by the obliteration of the
intervillous spaces between the chorion and reflexa.

The Prevention and Treatment of Post-partum Hemorrhage.—This sub-
ject was discussed at the recent meeting of the British Medical Association,
the basis for the discussion being a paper contributed by BYERS, of Belfast
(*British Medical Journal*, 1900, No. 2072). It is stated that the average
amount of blood lost in childbirth is about one pound. Clinically, how-
ever, no fixed amount can be taken as constituting hemorrhage, as each
patient differs in this respect from others. The obstetrician must expect
that post-partum hemorrhage may occur where there is a history of hemor-
rhage at previous confinements, where pregnancies follow each other rapidly,
where patients take little exercise, eat freely and use stimulants, in elderly
primiparæ, and where metritis exists during pregnancy. Overdistention of
the uterus or the presence of a tumor also favors hemorrhage. Albumin-
uria, extreme mental depression, and disturbances of the vascular system
predispose to it. During labor, pains which are strong and quick, but cease
suddenly, with long intervals between the pains, should arouse suspicion
of uterine exhaustion ; rapid, jerking pulse, with low tension, is also present
in many of these cases.

In prophylaxis, attention is called to the importance of managing prop-
erly the third stage of labor. The left hand of the obstetrician must follow
down the uterus, not using massage or stimulating it in normal cases, but
controlling it. The cord is tied by two ligatures—one near the child and the
other close to the vulva of the mother. When the placenta has been sepa-
rated several inches of the cord are expelled ; this can be determined by the
altered position of the ligature upon the cord. The separation of the
placenta is also recognized by a swelling detected above the pubes, due to
the bulging of the lower uterine segment, and sometimes taken for a dis-
tended bladder. The uterus rises up suddenly and becomes more movable
than formerly.

In addition to the proper delivery of the placenta and the removal of all
portions, it is most important in avoiding post-partum hemorrhage not to
deliver in the absence of pains. This is almost sure to be followed by severe
hemorrhage. Byers counsels the use of strychnine and ergot before and
during labor in suspected cases, with hydrochloric acid in plethoric patients
and iron in those who are anæmic.

In the actual treatment of hemorrhage he would use uterine massage, hot
intra-uterine douching with normal salt solution, the introduction of the
hand and the removal of adherent portions of placenta or membrane, pack-
ing the uterus with antiseptic gauze, and dragging down the uterus, after
gauze packing, by stout tenaculum forceps passed through the lips of the
cervix. Should hemorrhage occur from lacerations they must be closed by
suture. In after-treatment the injection of normal salt solution and stimuli,
with abundant nourishment, is indicated.

In discussion, BOXALL thought the loss of blood in labor to be not less

than twenty ounces in the average case. In a considerable number there was no assignable cause for hemorrhage. He had observed that alcohol favored hemorrhage, while rupture of the membranes and prompt delivery prevented it. Quinine and nux vomica given before labor were useful, while ergotole has been of service in his cases.

DERMATOLOGY.

UNDER THE CHARGE OF

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Tinea Versicolor of the Face.—POWELL (*British Journal of Dermatology*, April, 1900), in a note read before the Dermatological Society of Great Britain and Ireland, calls attention to the frequency of tinea versicolor of the face in Assam, India. In less than three months he saw fifty-six cases, nine of which were examined microscopically, and in all of these the microsporon furfur was found. On black skins the patches are of a chamois-skin color. The fungus seems to be identical with the European variety. The author attributes the frequency of the affection to the fact that the natives anoint the face and body with oil, and seldom use soap.

Lupus Erythematosus and Multiple Carcinoma.—KREIBICH (*Archiv für Dermatologie und Syphilis*, Band li., Heft 3) reports a case of erythematous lupus accompanied by multiple carcinoma. The lupus began upon the lower lip some two years and a half before the patient came under observation ; later the upper lip and the nose were affected. About two years later the cancerous affection began. The author regards the case as one of cancer developing upon an inflammatory basis, the inflammation, through œdema and loosening of the connective tissue, making possible the atypical proliferation of the epithelium.

The Histopathology of Pityriasis Rosea.—HOLLMANN (*Archiv für Dermatologie und Syphilis*, Band li., Heft 2) finds that in the macular stage of pityriasis rosea the changes are chiefly in the cutis, and consist of a marked widening of the superficial vascular network, a more or less noticeable perivascular cell-infiltrate in the papillary body and the subpapillary layer of the cutis, and œdema of the upper part of the corium. In a later stage of the disease all these changes are still more marked, especially the perivascular infiltrate. The rete also shows considerable changes : interepithelial and intraepithelial œdema is marked, and there is a proliferation of the prickle-

cell layer, especially in the interpapillary portions. Further on in the course
of the affection small vesicles are formed beneath the corneous layer of the
epidermis. After a time the horny layer is cast off; with this the disease
reaches its acme. The author is of the opinion that the disease process
begins in the cutis, and later involves the different layers of the epithelium.

Scleroderma Following Injury.—LESLIE ROBERTS (*British Journal of
Dermatology*, April, 1900) reports very briefly the case of a child who, when
two years of age, fell against the edge of a fender, wounding the surface of
the abdomen. Shortly afterward the bruised surface became indurated, and
during the next two years the induration advanced toward the right shoulder
in isolated patches separated by healthy skin. Reaching the shoulder it
descended the arm, following the cutaneous branches of the median and
radial nerves. The index finger became contracted, the thumb stiff, and the
skin between the finger and thumb rigid.

The Experimental and Clinical Properties of the Achorion Schonleinii.
—BUKOVSKY (*Archiv für Dermatologie und Syphilis*, Band li., Heft 3) con-
cludes from experimental inoculations upon the skin of man and into the ani-
mal organism that the quality of the soil plays a great part in the fate of the
fungus. The more indifferent the skin shows itself against the invasion of
the fungus the more the danger of the occurrence of favus; the stronger the
inflammatory reaction the less tendency to the disease, and the occurrence
of vesicular inflammation makes the formation of a scutulum impossible.
The achorion is not toxic for the animal organism. After its intravenous
injection there arises in the lungs the macroscopic picture of a mycotic
pseudotuberculosis. Microscopically leucocytic nodules are seen, with giant-
cells of epithelial origin, around the threads. The fungus grows only in a
rudimentary manner owing to the cell infiltrate hindering its vegetation.

A Clinical and Bacteriological Study of Impetigo.—SABOURAUD
(*Annales de Dermatologie et de Syphiligraphie*, 1900, Nos. 1 and 2) presents in
two elaborate memoirs some of the results of his study of the several forms
of impetigo. He distinguishes two clinical varieties. The first of these is
the impetigo contagiosa of Tilbury Fox; the second, the impetigo of Bock-
hart, characterized by rounded pustules, each containing a hair in the centre
and having pustular contents from the beginning. Impetigo contagiosa is a
contagious, auto-inoculable malady in which the streptococcus is constantly
present. It may assume an ulcerative form, and thus become ecthyma, an
affection which has incorrectly been made a morbid entity. Secondary in-
fection by the staphylococcus almost always occurs and causes suppuration.
By the pullulation of the staphylococci pustules of purely staphylococcic
origin may be produced between the lesions of impetigo contagiosa. In the
author's opinion the streptococcus of impetigo is the streptococcus of Feh-
leisen.

The Histopathology of Epidermolysis Bullosa.—ELLIOT (*New York
Medical Journal*, April 28, 1900), who examined sections of skin objectively
normal and unirritated, taken from a case of epidermolysis bullosa under his

observation, found the stratum corneum and stratum granulosum normal. In the deeper portions of the stratum spinosum, especially in the interpapillary prolongations, degenerative cellular changes were noticed. The basal layer was the particular seat of the alterations, and was attacked in its entirety. The changes involved the entire cell, altering its staining properties in varying degree. These cellular changes are attributed by Elliot to coagulation necrosis. He believes the chief feature in the morbid process to be an acquired or inherited abnormal irritability of the vascular apparatus of the skin, and, as the consequence of constant response to slight irritation, the basal portion of the rete is continually bathed in serous transudation, bringing about degenerative changes.

Rontgen Rays in the Treatment of Skin Diseases, and for the Removal of Hair.—WILLIAM ALLEN PUSEY (*Journ. of Cut. and Gen. Urin. Dis.*, July, 1900) states that the effect of the rays upon the skin and subcutaneous tissues are all inflammatory in character, ranging from slight erythema to violent inflammation, ending in necrosis. The two actions of the Röntgen rays on tissues which offer the most promising prospects of utilization for therapeutic purposes are : (1) Its power of causing the falling out of the hair, and (2) its power of causing inflammatory reaction and influencing the nutrition of connective tissue. The practical problem is the application of the rays in such a manner that undesirable results be avoided. One should not use a current of more than one and a half ampères and twelve volts' strength, this current, of course, being much weaker than that employed for skiagraphy. An inductor of more than 30 cm. spark-length should not be used, nor should exposures be too long or too frequent. At the beginning the sittings should not be longer than five minutes, and the distance of the tube not more than 15 cm. Freund (who has done considerable experimenting upon the skin) recommends for the attainment of the best results the use of a mechanical interrupter run at the rate of 800 to 1000 interruptions per minute. Suitable lead masks, for protecting surfaces which are contiguous to the areas to be treated, should be used. The evidences that the exposures have been carried far enough are : The appearance of erythema or pigmentation ; the blanching of the hair, and the loosening of the hair. The application of the Röntgen rays has been chiefly in four classes of affections : In hypertrichosis, for the removal of hair ; in diseases of the hair and of the hair follicles ; in inflammatory diseases, like chronic eczema, and in certain specific diseases, like lupus. The author believes that the agent is a valuable one for the removal of hair, especially in cases where the growth is diffuse and profuse. In lupus the rays seem to have a selective action, and, employed properly, constitute a remedy of value.

An Antiseptic Soap.—HERBERT SKINNER (*Brit. Journ. of Derm.*, May, 1900) gives the following formula for an ethereal solution of soap which can be made extempore. It can be rendered antiseptic, not with mercuric chloride, but with the biniodide freshly prepared—that is, mercuric chloride dissolved in a strong solution of potassium iodide. R. Acidi oleici, alcohol, of each, ℥ss ; liquor ammonii fort., q. s.; ether methylat., ad. f ℥ij. The first two are mixed and the ammonia added in order to neutralize the acid, then add the ether. It is far superior to any ordinary soap.

Herpes Zoster of the Finger.—SUERMONPREZ and PLATEL (*Journ. des Mal. Cut. et Syph.*, December, 1899) assert that affection of the fingers in this disease is not so rare as is generally supposed. It usually affects the metacarpal or middle phalanges of the fingers, and is very rare on the thumb. The authors believe it to be due, in every instance, to a direct infection of the finger, traumatism being only of secondary importance in its etiology. It differs from herpes elsewhere in the absence in the beginning of local congestion, a large, flat bleb being the first lesion that is noted.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Cirrhosis and Multiple Adenomata of the Liver.—SCHMIEDER (*Virchow's Archiv*, 1900, vol. clix., p. 290) reports a case of multiple adenomata of the liver with accompanying cirrhosis, and discusses the relation between simple hypertrophy, adenomata, and carcinomata. He also expresses his belief as to the factors giving rise to adenomata of the liver.

In his review of the literature he shows that a sharp line between hyperplasia of hepatic tissue and adenomatous formation cannot be drawn, and that many of the reported cases of adenomata of the liver are combined with cirrhosis of that organ.

Schmieder gives a full clinical history of his case and detailed study of the liver, both macroscopically and microscopically. Careful search reveals to him no connection whatever between the interlobular bile-ducts and the adenomatous formations. On the other hand, he proceeds to demonstrate that the islands of liver cells which are cut off and included by the connective tissue in the cirrhotic process are the points of origin of multiple adenomata. In the centre of these isolated masses of hepatic tissue the liver cells take on a vicarious growth, and one can recognize that the most centrally lying cells are largest. Their structure corresponds completely to normal liver cells, with the exception that they are larger. Single and multinuclear giant cells are found here, and it is by the division of these giant cells that adenomatous cells arise.

His sections of very small adenomata reveal frequently the transition of large multinuclear liver cells into columns of adenomatous cells. Once these columns have arisen the subsequent tumor growth is very rapid, and soon all trace as to its origin is completely lost.

He also finds in isolated patches of large adenomata a change in character

of the tumor which approaches cancer. This is shown by thick columns of tumor cells assuming an alveolar arrangement, by the centre of the growth becoming converted into a mass of cells devoid of definite arrangement, and, finally, by the actual demonstration; in a small area, of true cancerous growth.

Schmieder regards the cirrhotic process as preceding the adenomatous formations, and advances in support of his view the fact that cirrhosis is a diffuse condition, occupying all parts of the liver, and .is, consequently, found in portions where adenomata do not exist; that his microscopical study convinces him that cirrhosis is an extremely chronic process, while the tumor formation is a recent and rapidly developing one; and, finally, the clinical symptoms pointing to cirrhosis extended in his case over a period of two years.

In conclusion, he emphasizes his conception that cirrhosis is the first factor in the production of adenomata of the liver, and that the establishment of this view would give a means by which the multiple adenomata might be classified in a special group; at the same time he warns against the assumption that the tumor formation in this case may be placed parallel with the origin of hepatic tumors in general.

Structure and Origin of the Cavernomata of the Liver.—SCHMIEDEN (*Virchow's Archiv*, 1900, vol. clxi., p. 373), in a well-written article emanating from Orth's laboratory, discusses at length the five theories so far proposed in regard to the origin of the cavernomata of the liver, and on the basis of the study of thirty-two cases coming under his own observation adds a sixth theory, in favor of which he advances strong arguments based on histological findings and embryological considerations.

Cavernomata of the liver have frequently been the object of investigations ever since they were first described by Virchow. The interest taken in them stands in no relation to their clinical and pathological significance. They are frequently found at autopsies, but have no bearing on the other lesions of the liver or of the body in general. The point in dispute is their histogenesis; the developed tumor possesses little interest.

The five theories of the starting-point of these cavernous formations are the following:

1. Primary growth of connective tissue.
2. Vascular congestion.
3. Primary atrophy of liver cells.
4. Biliary congestion.
5. Hemorrhage.

Of these theories only two deserve serious consideration, namely, the first and second. The other three have little or no evidence in their favor.

The origin from a growth of connective tissue is the oldest theory, and is at present strongly upheld by Ribbert, who uses the liver cavernoma as a model for all cavernous angiomata, and regards it as an angiofibroma. Against this view is the fact that liver angiomata occur with no connective tissue, but with only liver cells between the blood spaces. It may also be asked why the connective tissue takes the well-known form of the liver cavernoma instead of the structure of cirrhosis or of a fibroma, and when the growth of the tumor stops after a certain time?

The theory of congestion, lately defended by Scheffen, is that the blood-vessels in circumscribed areas of liver tissue become dilated, and that the liver cells in such areas disappear. Against this view are the facts that cavernomata are no more common in cases of chronic passive congestion than in normal livers, and that no evidence in the way of pigmentation can be found favoring the view that the liver cells have undergone atrophy and disappeared.

The writer was started in his work by the study of a case which suggested a defect of development as the origin of these tumors. This led him to study the livers of the new-born. The livers were hardened in formol-Müller and then cut into thin sections. In two cases liver cavernomata were found.

The 32 cases studied in all included some cases from animals other than man. They were divided as follows : 18 solitary and 14 multiple angiomata. In 24 cases the septa were fibrous or fibro-muscular ; in 8 cases the partition walls consisted of more or less changed liver cells. In two of these eight cases there were many examples of both kinds which macroscopically could not be told from one another. Most of them lay directly under the capsule.

In the majority of the cases the outer wall was of the same strength as the septa within. Vessels of all sorts accompanied by the ordinary periportal connective tissue entered the tumor, but extensive capillary anastomosis with the vessels of the adjoining liver tissue was lacking.

The writer thinks that the liver cavernoma owes its origin to a developmental anomaly or defect (Anlagefehler), that it belongs in a group with the other tissue malformations occurring in the liver and in other parts of the body, and should be included in group 1 of the classification given by Lubarsch—that is, among the tumors in which the arrangement of the tissue elements differs from the tissue from which they arise, but usually show little or no evidence of growth.

The liver cavernomata do not belong in the same class with the cavernous angiomata of other organs ; for example, of the skin. While the latter are to be regarded as true bloodvessel tumors, the liver cavernomata can be regarded as tumors only in a broader sense of the word.

The term " angioma hepatis " is not appropriate ; " cavernoma " or " nævus cavernosus hepatis " is to be preferred.

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A CLINICAL STUDY OF DIPHTHERIA.

2093 CASES TREATED BY THE WRITER AT THE BOSTON CITY HOSPITAL.

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DIPHTHERIA properly treated with antitoxin presents a clinical picture very different from that of the text-books of three or four years ago. From being the most fatal of the acute infectious diseases, with a death-rate of from 30 to 50[1] per cent., its mortality has been lowered to such an extent that it is now but a little more important factor in the total death-rate of Boston than typhoid fever.[2]

The death-rate from diphtheria in Boston for fifteen years previous to 1894 and before the use of antitoxin was 30.8 per cent.;[3] the death-rate from the same disease in Berlin for four years previous to 1895 and before the use of antitoxin was 35.3 per cent.;[4] and the hospital death-rate for the United States and Europe was about 46 per cent.[5]

In the Emperor and Empress Frederick's Children's Hospital at Berlin during three years previous to 1894, 1081 cases of diphtheria were treated without antitoxin, with a death-rate of 38.9 per cent.;[6] in the Children's Hospital of Paris during four years previous to 1894, 3971 cases of diphtheria were treated without antitoxin, with a death-rate of 51.7 per cent.;[7] and in the Boston City Hospital during four years and one month previous to February 1, 1894, 1421 cases of diphtheria were treated without antitoxin, with a death-rate of 45.3 per cent.—that is to say, during the four years immediately preceding the

advent of antitoxin 6473 cases of diphtheria were treated in the large hospitals of Berlin, Paris, and Boston, of whom 3117 died.

In 1894 the antitoxin treatment was begun. Roux and his colleagues at the Pasteur Institute had been studying the toxin of diphtheria, and had succeeded in isolating a poison of great potency. They had been able to immunize animals and had proven that the serum of such immunized animals possessed the power of protecting other animals against this poison and of stopping the morbid processes in those animals in which diphtheria had been experimentally produced. The experimental work was so convincing that on February 1, 1894, the treatment of the patients in the diphtheria wards of the Hôpital des Enfants Malades with this serum was begun. The treatment was a success from the first. The death-rate in this hospital for the first six months of the antitoxin treatment was less than half what it had been during the three years immediately preceding its use.[8] The promise given by this first trial has been fulfilled, and the death-rate from diphtheria has been greatly reduced wherever antitoxin is used. The latest health reports show that the death-rate from diphtheria in London is 15.3 per cent.;[9] in Philadelphia 20.4 per cent.;[10] in Milwaukee 17.7 per cent.;[11] in St. Louis 16.4 per cent.;[12] and in Boston 9.7 per cent.[13] Also that the total number of deaths from diphtheria in Berlin during 1899 was 609, whereas the annual average number of deaths from diphtheria for five years previous to the use of antitoxin was 1318;[14] and that the total number of deaths from diphtheria in Paris during 1899 was 336, whereas the annual average number of deaths from diphtheria in that city for five years before the use of antitoxin was 1514.[15]

The present contagious department of the Boston City Hospital was opened in 1895, and is under the able direction of Dr. John H. McCollum. Antitoxin has been used here from the first; and the death-rate has been low, and has decreased with each succeeding year. It was my good fortune to serve as clinical assistant to Dr. McCollum for two years, from August, 1898, until August, 1900. During my second year with Dr. McCollum, or from August 7, 1899, until August 6, 1900, I had charge of the medical treatment of the patients in the diphtheria wards. We were assisted by a competent staff of house officers, but I personally saw each patient daily, and during the acute period of the disease repeatedly during each day; and ordered all antitoxin that was given, and carefully watched the progress of the disease in each and every case. During these twelve months 2093 cases of unmistakable diphtheria were admitted to the wards. Of this number 131 proved to have a mixed infection and 1962 were uncomplicated. For the present we will consider only the 1962 uncomplicated cases. Of this number 240 died, giving a death-rate of 12.23 per cent. But

of the 240 fatal cases 69 were moribund and died within twenty-four hours of admission. If we deduct these as being too far advanced in the disease to respond to treatment, we have a modified death-rate of 9 per cent. This remarkably low death-rate is due to the use of anti-toxin in sufficient quantities to counteract the diphtheria poison. The cases as a rule were severe, as the cases sent to hospitals usually are : and the health reports show that there was a severe epidemic of diphtheria in Boston during the winter of 1899 and 1900.

AGE AND SEX. Of the 1962 uncomplicated cases 947 were males and 1015 were females. There was no appreciable difference in the death-rate of the sexes. There were 1647 patients less than fifteen years of age, and 315 patients over that age. The death-rate for those under fifteen years of age was 14 per cent., and for those above that age it was 2.85 per cent. The youngest patient treated was an infant boy, aged six weeks, who recovered ; and the oldest was a woman, aged sixty-eight years, who was very ill, was given 44,000 units of antitoxin, and also recovered.

The accompanying table (Table I.) shows the distribution by age and by sex, and also the deaths for each year of life, of the sexes separately, and in total with the mortality percentages for each :

TABLE I.

Table of 1962 cases of diphtheria showing the distribution by age and by sex, with the deaths by sex and in total, for each year of life, and the mortality percentages.

Ages in years.				Males.			Females.			Totals.		
				Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.
0	to	1	.	25	9	36.00	22	10	45.45	47	19	40.40
1	"	2	.	55	21	38.18	63	19	30.15	118	40	33.90
2	"	3	.	87	18	20.69	82	21	25.60	169	39	23.00
3	"	4	.	129	20	15.50	95	15	15.79	224	35	15.60
4	"	5	.	106	12	11.32	106	19	17.92	212	31	14.60
5	"	6	.	86	14	16.27	108	10	9.25	194	24	12.30
6	"	7	.	77	6	7.79	95	12	12.63	172	18	10.04
7	"	8	.	65	6	9.23	63	5	7.93	128	11	8.60
8	"	9	.	56	1	1.78	40	1	2.50	96	2	2.08
9	"	10	.	48	2	4.17	48	4	8.33	96	6	6.24
10	"	11	.	26	3	11.53	35	1	2.85	61	4	6.55
11	"	12	.	12	0	......	22	0	......	34	0	
12	"	13	.	13	0	......	26	2	7.69	39	2	5.12
13	"	14	.	16	0	......	16	0	......	32	0	
14	"	15	.	12	0	......	13	0	......	25	0	
15	"	20	.	33	1	3.03	42	3	7.14	75	4	5.33
20	"	30	.	66	0	......	84	4	4.76	150	4	2.66
30	"	40	.	28	1	3.57	43	0	......	71	1	1.40
40	"	50	.	3	0	......	8	0	......	11	0	
50	"	60	.	4	0	......	3	0	......	7	0	
60	"	70	.	0	0	......	1	0	......	1	0	
Totals .				947	114	12.09	1015	126	12.41	1962	240	12.23

TABLE II.

Table of 1962 cases of diphtheria in five-year groups; also showing the distribution by sex and the deaths by sex and in total, with the mortality percentages.

Ages in years.	Males.			Females.			Totals.		
	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.
0 to 5 . .	402	80	19.9	368	84	22.8	770	164	21.30
5 " 10 . .	332	29	8.7	354	32	9.0	686	61	8.40
10 " 15 . .	79	3	3.7	112	3	2.6	191	6	3.10
15 " 20 . .	33	1	3.0	42	3	7.1	75	4	5.30
Over 20 . .	101	1	0.99	139	4	2.8	240	5	2.00
Totals . .	947	114	12.09	1015	126	12.41	1962	240	12.23
Under 15 . .	813	112	13.6	834	119	14.2	1647	231	14.00
Over 15 . .	134	2	1.4	181	7	3.8	315	9	2.85
Totals . .	947	114	12.09	1015	126	12.41	1962	240	12.23

An examination of this table shows a decreasing death-rate from infancy to adult life. The other variations, both as to sex and mortality, are probably accidental, and would be eliminated in a sufficiently large number of cases. In Table II. the same cases are grouped into periods of five years of life, and the same decrease in the death-rate from infancy to adult life is shown, but with less minor variations.

If this same series of cases is classified simply by numbers, beginning with the first patient admitted, and numbering consecutively, and then dividing them into groups of one hundred each, the death-rate computed by hundreds varies from 5 per cent. to 19 per cent. This seems to me a very interesting fact, and confirms the observations of Prince[16] concerning the dangers of drawing conclusions from too small numbers of cases.

DISTRIBUTION OF MEMBRANE. A study of the distribution of the diphtheritic membrane shows that in some cases it was on only one tonsil, and in some cases on the posterior pharyngeal wall, and in other cases in the nose or on denuded areas of skin. But in a majority of the cases it was on both tonsils and often elsewhere in addition. In some cases both tonsils, uvula, and soft palate were completely covered; and in such cases when there was considerable attendant œdema of the peritonsillar tissues together with the toxæmia of the disease and the consequent lack of co-ordination of the muscles of the throat and tongue, respiration was seriously impeded. The effects on the respiratory efforts are peculiar, and patients in this condition breathe somewhat as do etherized patients when the tongue falls back against the soft palate. Such cases were sometimes sent to the hospital as cases of laryngeal stenosis; and one adult patient who had been in the hospital about

twelve hours became so cyanotic and distressed for breath as to demand operative interference. He was very ill and semi-conscious, but the coma grew rapidly worse, and finally it was evident that he was getting insufficient air. A digital examination of the throat showed that the pharynx was literally full of diphtheritic membrane. Much of this was forcibly removed, after which the cyanosis became less marked and the patient regained consciousness sufficiently to say that he felt better. He was very ill, however, and we had no hope of his recovery, but from that time he improved, and although the diphtheritic membrane re-formed to some extent, he finally recovered. Antitoxin was given in 8000 unit doses until 110,000 units had been given; and although the throat was not entirely clear the toxæmia seemed relieved and the patient's condition so much improved that no more antitoxin was necessary. He was discharged well after sixty-five days in the hospital.

The following statement shows in detail the distribution of the diphtheritic membrane for this series of cases: In 1528 cases it was on both tonsils; 243 cases on one tonsil; 404 cases on the uvula; 173 cases on the posterior pharyngeal wall; 244 cases on the palate; 12 cases on the lips; 3 cases on the tongue; 4 cases on the epiglottis; 1 case on the inner surface of the cheek; 1 case in the external auditory canal; 1 case at the outer canthus of the eye; 1 case on both labia majoræ and minoræ; 71 cases in the nostrils, and one patient, seven months old, had a patch of diphtheritic membrane on a denuded area of skin in the fold between the neck and shoulder, two and one-half inches by one inch in area, in addition to large patches on both tonsils and soft palate. He recovered, but it took 40,000 units of antitoxin to save his life. In some cases in which the patient was admitted early in the disease the diphtheritic membrane extended and thickened after the administration of antitoxin was begun; but when enough antitoxin had been given to neutralize the existing toxæmia its effect on the membrane was soon noticeable, and the appearance of the latter greatly changed. The diphtheritic membrane represents the amount of local reaction taking place, and is a valuable guide in forming an opinion as to the intensity of the local process; but it is not a safe index of the amount of toxin absorbed and the consequent existing toxæmia. It is therefore but one of the guides in the administration of antitoxin. It often begins to undergo retrograde change, however, soon after the antitoxin treatment is begun, and on account of that remedy, and sometimes disappears completely in twenty-four or forty-eight hours. Sometimes it becomes loosened, rolls up at the edges and peels off in large pieces; sometimes, however, it seems to melt away, leaving adherent streaks which are the last to disappear. In exceptional cases these streaks are very persistent and remain long after the administration of antitoxin has ceased to be

indicated. In the case of the patient referred to who received 110,000 units of antitoxin there were small streaks of exudate on the uvula for twenty-eight days. In 341 cases there was either no diphtheritic membrane on the tonsils or its disappearance was not recorded; and the average number of days before the remaining 1621 throats became perfectly clear was 3.9 days. The throats were not considered clear, however, until all streaks and spots of exudate had disappeared from the tonsils, uvula, palate, and posterior pharyngeal wall.

NASAL DIPHTHERIA. As already stated, there were 71 patients with diphtheritic membrane in the nostrils; and there were 780 who had nasal discharges of such a character as to suggest diphtheritic membrane in the nasopharynx; while bacteriological examination showed the bacilli of diphtheria in the nasal secretions of 790, and in 158 of these the bacilli were found in the nose only. I wish to call especial attention to the fact that in this series of 1962 cases of diphtheria 780 cases, or about 40 per cent. of the entire number, had a more or less severe diphtheritic process in the nose. The frequency and importance of nasal diphtheria is not sufficiently appreciated by the general medical profession, and the matter is but little more than mentioned in the latest text-books. It is not uncommon, however, and attention was called to it before the etiology of the disease was fully understood. There was an epidemic of diphtheria in Boston during the winter of 1888 and 1889 that caused considerable anxiety to the profession, and at one of the meetings devoted to its consideration Dr. McCollum presented a carefully prepared paper which showed " that epidemics are due to contagion, not so much from the severe and recognized forms of the disease, as from the mild and unrecognized types, particularly the nasal." [17] One patient of this series, a boy, two years old, who had severe nasal diphtheria, from which he finally died, came to us from one of the other hospitals of Boston, where he had been under treatment three or four days. As the hospital from which he came had no diphtheria wards, I asked the admitting physician of that institution what other disease the patient had beside diphtheria, and was told that he had none; that he was admitted there because he seemed sick and in need of hospital care. At the time of admission there the patient had a rapid pulse and an elevated temperature; but except for a nasal discharge the physical examination was negative and the case rather obscure. Cultures had been taken, however, and the bacilli of diphtheria found. But in the interim the patient had been in an open ward of a general hospital, and some of the other patients from that ward followed him to the City Hospital.

CULTURES. Cultures were taken from the throat and nose in every case unless the patient died within a few hours of admission. As stated above, the bacilli of diphtheria were present in the nose in 790 cases;

in both nose and throat in 632 cases, and in the nose alone in 158 cases. In 944 cases the bacilli of diphtheria were found in the throat only, and in 228 cases they were not found in either nose or throat. Of these cases not showing the bacilli of diphtheria, 65 were intubed; 21 had beginning laryngeal stenosis, but were given antitoxin freely, and escaped operation; 1 had diphtheritic membrane in the nostrils; 2 coughed up casts from the trachea; 71 died, and the others ran a perfectly typical course of diphtheria and recovered.* It often happened that the first culture taken was negative and the subsequent ones positive. Some of the worst cases, with thick and extensive false membrane, persistently gave negative cultures until the membrane began to disappear, when it became possible to take cultures from the mucous membrane of the throat, and many bacilli of diphtheria would be found. This is because the bacilli, if present in the false membrane, are dead, and will not grow when planted in the culture tube. But when the false membrane has disappeared and cultures can be taken from the *mucous membrane* where bacteria *live* the growth is usually abundant, and if the bacilli of diphtheria are present they may be found. A knowledge of the presence or absence of the bacilli of diphtheria in border-line cases is of the greatest importance; but this test is only one of the many signs and symptoms of diphtheria, and must not be allowed to outweigh all other evidence. A clinical diagnosis of diphtheria is possible, and is often of as great importance as the patient's life is worth.

The physician is not justified in awaiting the results of the autopsy before making a diagnosis of pneumonia; yet the diagnosis of diphtheria is much more important, and it has often happened that patients ill with diphtheria were not sent to the hospital until all hope of recovery was gone, either because the result of the cultures was not known or because a negative report had been given. This is one of the reasons for the large number of moribund cases that are admitted to the hospital. Such patients come to us to die or to drag through a severe and prolonged illness, recovering only after enormous doses of antitoxin have been given. One physician who wanted to send a patient to the hospital, ill, as he said, with non-diphtheritic sore-throat, asked how it is possible to have diphtheria when the cultures are negative. It is not possible to have diphtheria without the presence of the specific germs of that disease at the site of the local process; but there are many chances for error in the somewhat elaborate technique necessary for their cultivation and detection under the microscope.

* If those cases not having positive cultures were ruled out as not diphtheria, the total number of cases would be reduced 11.6 per cent., and the total number of deaths would thereby be reduced 29.6 per cent. The total number of cases would then be 1734, and the total number of deaths 169; and the total death-rate would be 9.7 per cent. instead of 12.23 per cent., as it is for the entire series of 1962 cases. But the 228 cases from whom positive cultures were not obtained were diphtheria, and could not be ruled out.

I am told that one hospital in New England has adopted a rule which denies admission of patients ill with diphtheria until positive cultures have been obtained. If such a custom were followed at the Boston City Hospital the death-rate would be much lower than at present; but it would be at the cost of many lives. I do not wish to be understood as speaking lightly of the value of the bacteriological test for diphtheria; but it is of secondary importance in cases with a severe onset and in the large class of cases in which the physician is called late. Diphtheria is a terrible disease, and an early diagnosis is often the most important thing in the world to the sufferer. Cultures should be taken in every case, but the physician should not await the report of the bacteriologist before giving antitoxin if he *thinks* he is dealing with diphtheria, taking care, of course, to inform himself as to what the early clinical picture of diphtheria really is.

THE HEART. The hearts of this series of cases were examined with great care and frequency, and the results of these examinations faithfully recorded. About 65 per cent. of the cases had some form of cardiac disturbance at some time during the progress of the disease. These disturbances were usually slight, and in a large majority of cases transitory, yet a knowledge of the condition of the heart played an important part in determining the prognosis and treatment as each case progressed. A soft systolic murmur was the most frequent abnormality noted, and was present in 984 cases. It was sometimes heard loudest at the base, sometimes loudest at the apex; but in a majority of cases it was loudest over the mitral area. In some cases the murmur seemed to be due to cardiac dilatation, in a very few cases to an active endocarditis; but usually to a lack of tonicity in the heart muscle. In 496 of these cases with systolic murmurs the heart's action was also more or less irregular. An irregularity in the heart's action was also of frequent occurrence, and was noted in 658 cases. The irregularities varied from cases of well-marked arrhythmia to the most fantastic combinations of irregularity and intermittency. A peculiarity of the irregular action of the hearts of diphtheria patients is the frequency with which the action changes. In some cases there is a simple irregularity in which the variations occur at regular intervals; these intervals may comprise three or four beats, or they may comprise sixty or seventy beats. In other cases the action may be fairly regular at one time, with only an occasional intermittency, and within a few hours be so tumultuous and irregular as to baffle description. Of the 658 cases in which the heart's action was irregular there were 496, as already stated, in which the action was also accompanied by a systolic murmur. There were 22 cases in which a *bruit de galop* or cantering rhythm was noted. This rhythm is always interesting, and was usually very perfect. Fourteen of the patients having this rhythm recovered and eight died. The

irregularity of the heart's action is due to the action of the toxin of diphtheria or its by-products on the nervous system, and is a much more frequent sequel of nasal diphtheria than of the other forms of the disease. This is doubtless due to the more abundant supply of lymphatics to the nasopharynx. This anatomical reason for the greater severity of nasal diphtheria was pointed out by Rotch in 1889.[18] In those cases—496 in number—having both a systolic murmur and an irregularity of action, the murmur was noted before the irregularity in 304 cases; and in the irregularity before the murmur in 79 cases; and the murmur and irregularity were detected at the same time in 113 cases. In 111 cases the most noticeable peculiarity of the heart's action was its great weakness. In 478 cases the cardiac abnormality was present at entrance; in the others it developed in the hospital. In those cases in which the abnormality developed while the patient was under observation it could often be predicted by the peculiar booming character of the heart's sounds.

The accompanying tables (Tables III. and IV.) show the time in the hospital at which the various abnormalities developed and their relative frequency at each four days during the progress of the disease. The histories of the onset of illness in this class of patients are far from reliable; but judging from such histories as were obtainable, together with the condition of the patients at the time of admission to the hospital, it seems fair to conclude that they had been ill *on an average* between two and three days when admitted.* The time varied from one day to two weeks, however.

TABLE III.

Table of 1962 cases of diphtheria, showing the number of cases in which cardiac murmurs only, and irregularity of the heart's action only, occurred, and the day in hospital on which such abnormalities were noted, with the percentages.

The time at which the abnormality was first noted.		Murmurs only.		Irregularity only.	
		Cases.	Per cent.	Cases.	Per cent.
At entrance		215	10.90	30	1.50
By the 5th day in hospital		115	5.80	35	1.70
" 9th " "		69	3.50	36	1.80
" 13th " "		47	2.30	28	1.40
" 17th " "		27	1.30	18	0.91
" 21st " "		10	0.50	3	0.15
" 27th " "		3	0.15	8	0.40
After the 30th " "		2	0.10	4	0.20
Totals		488	24.8	162	8.2

In 22 cases a *bruit de galop* or continuing rhythm was noted. Of this number 8 died and 14 recovered.

* In 134 cases no histories were obtainable. The average duration of illness before admission of the remaining 1828 cases, according to the histories, was 2.5 days.

TABLE IV.

Table of 1962 cases of diphtheria, showing the number of cases in which both cardiac murmurs and irregularity of the heart's action occurred, and the day in the hospital on which such abnormalities were noted, with the percentages.

The time at which the first abnormality to appear was first noted.	Murmur first, irregularity later.		Irregularity first, murmur later.		Both murmur and irregularity detected at the same time.	
	Cases.	Per cent.	Cases.	Per cent.	Cases.	Per cent.
At entrance	170	8.6	20	1.0	43	2.1
By the 5th day in hospital . .	59	3.0	24	1.2	28	1.4
" 9th " " . .	32	1.6	16	0.81	19	0.96
" 13th " " . .	23	1.1	7	0.35	11	0.50
" 17th " " . .	12	0.61	5	0.25	5	0.25
" 21st " " . .	5	0.25	2	0.10	3	0.14
" 25th " " . .	1	0.05	3	0.14	3	0.14
After the 30th " " . .	2	0.10	2	0.10	1	0.05
Totals	304	15.4	79	4.0	113	5.7

The total number of cases with cardiac murmurs was 984, or 50.1 per cent. of the whole. The total number of cases in which the heart's action was irregular was 658, or 33.5 per cent. of the whole.

PULSE. As is well-known the toxin of diphtheria or its by-products in the human system produces a rapid action of the heart. The pulse-rate is therefore an important guide in the prognosis. and often a valuable aid in the diagnosis of diphtheria. Patients at the beginning of an attack of diphtheria often do not feel ill except for chilly sensations, a feeling of lassitude, and possibly an attack of vomiting. It also often happens that the initial temperature is transitory.* But the pulse is almost always accelerated out of all proportion to the other symptoms. In such cases with a history of sore-throat or nasal discharge it is a great help in forming a correct diagnosis. Later in the disease patients who are being treated with antitoxin are often very comfortable; but if the pulse-rate continues high they are still much more seriously ill than they themselves can possibly realize. I have repeatedly been obliged to tell my adult patients that they were still seriously ill when they declared they felt as well as ever in their lives. A rapid pulse early in an attack of illness, especially if it is out of proportion to the temperature, and if the patient does not feel much sick, and thinks he has contracted a cold, should lead one to consider the possibility of

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* For a careful consideration of the temperature in diphtheria see Dr. McCollum's paper, "A Clinical Study of Eight Hundred Cases of Diphtheria," Medical and Surgical Reports of the Boston City Hospital, Ninth Series, 1898. His conclusions in brief are, " that the temperature in this disease is not specially elevated . . . and that when an elevated temperature is present it is usually due to some complication." My observations are entirely in accord with these conclusions. Moreover, the temperature in no way indicates either the severity of the infection or the seriousness of the illness in uncomplicated diphtheria, and is of importance only as a symptom of existing complications and a guide in prognosis and treatment.

diphtheria. A rapid pulse continuing after the initial period of an attack of diphtheria means a guarded prognosis, as to the time of recovery at least, and *continued rest in bed*. The pulse of one ill with diphtheria is often of a variable quality, and may be full and strong at one time, and within an incredibly short time become soft and weak and irregular or intermittent. It is therefore not safe to await a soft pulse before beginning stimulation ; and the pulse must be considered in connection with the existing toxæmia.

The accompanying table (Table V.) gives the maximum pulse-rate and the corresponding mortality percentages for this series of cases. For the compilation of this table the cases are first divided into those under five years of age and those above that age, as the pulse in early childhood is normally high ; and later the 1962 cases are considered as a whole.

TABLE V.

Table of 1962 cases of diphtheria, showing the maximum pulse-rate for all patients under five years of age, and for all patients above that age separately ; and also for all patients of all ages, with the deaths and mortality percentages.

Maximum pulse.	All cases under 5 years.			All cases over 5 years.			All cases of all ages.		
	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.
Less than 100	13	1	7.6	312	5	1.6	325	6	1.8
" " 110	40	2	5.0	189	9*	4.7	229	11	4.8
" " 120	168	14	8.4	358	19	5.3	526	33	6.2
" " 130	140	15	10.7	164	16*	9.7	304	31	10.1
" " 140	216	52	27.0	106	14	13.2	322	66	20.4
" " 150	58	19	32.7	31	3	9.6	89	22	24.7
" " 160	86	28	32.5	23	4	17.3	109	32	29.3
" " 170	16	10	62.5	2	1	50.0	18	11	61.1
" " 180	14	11	78.5	4	2	50.0	18	13	72.2
" " 190	4	2	50.0	1	1	100.0	5	3	60.0
" " 200	15	10	66.6	2	2	100.0	17	12	70.5
	770	164		1192	76		1962	240	

ALBUMINURIA. All those who studied diphtheria before antitoxin was used in its treatment agree that albuminuria was of very common occurrence in the disease. Osler[19] says that it is present in all severe cases, and Rotch[20] says that it is so frequent that it should be considered as a part of the disease.

The free use of antitoxin has changed this, however, and those patients treated early and with large doses often do not have albuminuria at any period of the disease. The urines in this series of cases were examined in the hospital laboratory by the house officers, under the direction of Dr. J. B. Ogden, and albumin was found in less than one-third of the entire number from whom specimens could be obtained. In 205 cases no specimen could be obtained, either on account of the extreme illness or youth of the patient. Of this number, 121 died ; 50

* One each had a pulse of 30 beats per minute before death.

of these within twenty-four hours of admission.   In the latter cases, of
course, no opinion could be formed as to the condition of the kidneys.   In
the case of one patient who lived more than twenty-four hours in the
hospital, the urine was greatly diminished in amount, and death occurred
from the toxæmia of diphtheria in five days.   In another case there
was suppression of urine, and the patient died on the sixth day in the
hospital ; and in still another case, that of an infant, one year old, the
patient died in convulsions on the third day in the hospital.   Although
this patient's skin was moist and his napkin freely wet, and the con-
vulsions seemed to be due to the toxæmia of diphtheria, the possibility
of a nephritis must be considered.   In the other fatal cases from whom
specimens were unobtainable there was no clinical evidence of nephritis.

The urine was examined in 1757 cases, and in no case was more than
one-fourth of 1 per cent. of albumin found.   There was one-fourth of 1
per cent. in 12 cases; one-eighth of 1 per cent. in 41 cases; one-tenth
of 1 per cent. in 29 cases; a large trace in 38 cases; a slight trace in
121 cases; the slightest possible trace in 230 cases; and in 1256 cases
no albumin was found.*   The urine was somewhat diminished in amount
in many cases ; was greatly diminished in amount in six cases, and there
was suppression in three cases in addition to the one already mentioned.
There was acute retention in quite a number of cases ; but catheteriza-
tion was necessary in only three or four instances, hot fomentations
usually being sufficient to relieve the trouble.

In those cases in which the urine was greatly diminished in amount
the use of hot packs was usually of great benefit, and only one of the
six cases terminated fatally.   In the cases of suppression hot packs
were also tried, but in only one case did the patient recover.   Great
care is necessary in the administration of hot packs to diphtheria
patients, on account of the weakened condition of the heart ; and they
were never given unless a physician could remain with the patient dur-
ing the entire time of the treatment.   If the pulse became very rapid,
or weak, or intermittent, or if the patient seemed depressed or greatly
disturbed by the pack, it was at once discontinued.   If conditions did
not improve, however, the pack was again tried, and sometimes with
remarkably good results.   Water, lemonade, and magnesium sulphate
were the only diuretics that seemed to be of value in these cases.

As a rule, there was but little œdema in these cases of nephritis ; but
in two boys, aged seven and nine years, both of whom had been very
ill, had palatal paralysis, strabismus, and great emaciation, there was
marked œdema of the scrotum, the organ becoming in each ease con-

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* In those cases from whom specimens were obtainable the urine was examined once every
four or five days during the course of the disease. It is possible that daily examinations would
have revealed some slight transitory albuminurias that thus escaped observation.   Such con-
ditions, if they existed, were of no clinical importance, however ; but, of course, would be of
scientific interest.

siderably larger than a baseball. Both finally recovered, and at the time of discharge from the hospital their urines were free from albumin. One was in the hospital fifty-seven days and the other seventy-five days. In the non-fatal cases the nephritis was usually transitory, and but few patients were discharged with albuminuria. In none of the fatal cases could death be attributed to nephritis; even those three cases in which suppression occurred showed in addition to this symptom the usual manifestations of the toxæmia of diphtheria.

The accompanying table (Table VI.) shows the number of cases in which the various amounts of albumin occurred; the number of patients who died, showing the corresponding amount of albumin with the mortality percentages.

TABLE VI.

Table of 1757 cases of diphtheria in which the urine was examined, showing the number of cases in which the various amounts occurred, with the deaths and mortality percentages.

	Cases.	Deaths.	Per cent.
No albumin found	1256	27	2.1
The slightest possible trace of albumin	230	24	10.4
A slight trace of albumin	121	14	11.5
A trace of albumin	38	11	28.9
A large trace of albumin	30	11	36.6
$1/10$ of one per cent. of albumin	29	13	44.8
$1/8$ " " " "	41	14	34.6
$1/4$ " " "	12	5	41.6
Total number examined	1752	119	6.7
" " not examined	205	121	59.0

Total number of cases examined								1752
" " with albuminuria								501
Percentage of cases showing albuminuria								28.5

LARYNGEAL STENOSIS. In this series of 1962 cases of diphtheria there were 337 cases of laryngeal stenosis. Of this number 213 were intubed and 124 responded promptly to the use of antitoxin and were relieved without intubation. Those who escaped operation were usually the ones sent to the hospital early in the disease. A majority of the operative cases demanded immediate relief, and were intubed as soon as admitted. In some cases, however, operation was deferred, with the hope that it would not be necessary, and was done later. Thirty-five patients were intubed during the second day in the hospital; but in only one instance was intubation first performed later than forty-eight hours after admission, and in this case the operation did not afford relief, and the autopsy showed that the trouble was below the larynx. Of the laryngeal cases not intubed twelve were adults, three of whom coughed up membranous casts of the trachea and bronchi. One young woman, aged twenty-four years, coughed up two casts, each of which extended from the larynx to the secondary bronchi, and measured nine inches in length. The first was not of great thickness, but was a per-

fect cast; but the second, which was dislodged thirty hours after the first, was thick and leathery and showed the markings of the cartilages of the trachea with great distinctness. It also demonstrated the fact that thick and extensive diphtheritic membrane may form in the air passages with great rapidity. The patient was given antitoxin freely and oxygen was used, but she died from the toxæmia of diphtheria forty-eight hours later. Two of the other adults died from pneumonia, evidently diphtheritic in origin, as casts of the secondary bronchi were coughed up by both, and there was no rusty sputum, although there were many râles of all descriptions, and both patients lived long enough for the resolution of a diplococcus pneumonia to begin. Of the remaining laryngeal cases who escaped operation 112 were under fifteen years of age, and all but 7 recovered. In addition to beginning laryngeal stenosis 60 of these 124 cases had nasal diphtheria and 103 had false membrane on the tonsils, 49 having nasal, pharyngeal, and laryngeal diphtheria, and in only 10 cases was the disease confined to the larynx. The death-rate for the entire 337 laryngeal cases was 31.4 per cent.; for the early cases who escaped operation, 8 per cent.; and for the operative cases, 45 per cent. Intubation was not performed unless it was absolutely necessary, the patient being given the benefit of the doubt in every case; for with the greatest skill in operating there is more or less shock to the patient, and the careful husbanding of the strength of those ill with diphtheria is of the greatest importance.

INTUBATION. Of the 213 intubations 96 died, 37 of them within twenty-four hours of admission; 40 during the acute stage of the disease, and within ten days of admission, from the toxæmia of diphtheria; 15 after the acute stage of the disease or from the degenerative processes of diphtheria, and 4 from pneumonia. Bronchopneumonia is of common occurrence in laryngeal diphtheria, not only in those cases that are intubed, but also in those cases who escape that operation. I believe, however, that many of the cases of death formerly attributed to this complication and to the extension of membrane are due to the toxæmia of diphtheria. Many of the cases of this series presented most of the symptoms of bronchopneumonia, and yet that disease did not exist. One boy, aged two years, who was intubed at entrance, died in three days, and came to autopsy, is an instance of this. The laryngeal tube afforded but partial and temporary relief, and was repeatedly removed and reinserted. No membrane was found in the tube, but it was always partially occluded with thick, tenacious mucus. The patient was restless and cyanotic, with hurried respiration and considerable delirium. Examination of the chest showed normal resonance and many râles. Râles in an intubation case are always of doubtful import. A differential diagnosis between a beginning bronchopneumonia and extension of membrane could not be made with definiteness, but the evidence seemed to be in favor of the latter. The autopsy showed, however,

that there was neither bronchopneumonia nor diphtheritic membrane in the lungs; but the bronchi, to their ultimate ramifications, were filled with the same thick, tenacious mucus that had been found in the tube; and cultures taken from this mucus showed myriads of the bacilli of diphtheria. Another patient, a boy, aged seven years, who was intubed at entrance and with but temporary relief, also had his tube removed and reinserted repeatedly. His tube was also partially occluded with thick, tenacious mucus each time it was removed, and when allowed to go without the tube the larynx would become filled with the same material, which, as it became dry, would completely obstruct respiration. Antitoxin was given in large doses at frequent intervals, and the character of the mucus changed to such an extent that the patient could clear the tube by coughing. Finally, the bronchial secretions became normal in character and amount, the respirations became less hurried, the peculiar distressed facial expression of the toxæmia of diphtheria disappeared, and the patient recovered. There were other similar cases, many of which were saved by a liberal use of antitoxin and careful attention to the laryngeal tube. If the infection in such cases is less severe and the patient is able to withstand the toxæmia of the disease for a sufficient time, the probabilities are that the presence of the bacilli of diphtheria in the bronchi would lead either to a deposit of diphtheritic membrane or to the development of a bronchopneumonia, and possibly to both complications. There were cases in which the diphtheritic membrane extended into the bronchi; and one of these, a girl, aged three years, coughed up a cast of the trachea and primary and secondary bronchi, on one side of which there were seven branches to the bronchial cast. This patient rallied from the toxæmia, but died from pneumonia twenty days after admission.

Reintubation was necessary in many cases, either because the tube became occluded and had to be removed or because it was coughed up by the patient. One boy who persistently coughed up his tube, and who had paralysis of the vocal cords, was intubed thirteen times, and finally recovered. Another boy, aged three years, developed post-diphtheritic paralysis, and was reintubed thirty-three days after the tube was first removed. The relief afforded was marked; the tube was worn six days and then removed, and the patient finally recovered.

TRACHEOTOMY. In three cases of this series in which the O'Dwyer tube failed to give relief a subsequent tracheotomy was performed. This operation proved useless, and all three patients died. One, who had been ill several days, and was scarcely breathing at entrance, was intubed without benefit, and soon stopped breathing. As it was impossible to revive her, tracheotomy was performed and only thick, tenacious mucus found in the trachea, and the patient did not breathe. I now think that this patient died from toxæmia and not from stenosis.

In another case, that of a boy, aged two years, the patient had been in the hospital about twelve hours, during which time he had worn a tube, but had breathed with difficulty, and seemed severely poisoned by the disease.   His mother was visiting him, and he attempted to get up, when he collapsed and stopped breathing.   He was hastily taken to the operating-room and the tube removed.   It was not occluded, and when it had been replaced artificial respiration and subcutaneous stimulation restored animation somewhat; but as there was still great difficulty in breathing, tracheotomy was performed.   Streaks of diphtheritic membrane were found in the trachea, but the respiration was no better after the operation, and the patient died from the toxæmia of diphtheria in about an hour.   Autopsy could not be obtained.

In the third case the difficulty proved to be due to the presence of thick mucus, and the patient responded to antitoxin and lived comfortably for a time, but died from a streptococcus pneumonia ten days after the operation.   The autopsy showed that the bronchial secretions had become normal.

In two other cases, not included in this series, in which intubation failed to give relief, tracheotomy was performed and saved the patients' lives.   One of them died from general peritonitis later, however.   One case was that of a child, aged twenty months, who was sent to the hospital as an urgent case of laryngeal diphtheria.   When seen by me she was suffering from marked stenosis and was extremely cyanotic.   She was intubed at once, but was afforded no relief.   A longer tube was inserted ; but with this tube in the larynx respiration was impossible, and all respiratory efforts ceased.   A hasty incision was made in the median line of the neck, but instead of finding the trachea the knife opened a pocket beneath the deep cervical fascia, which contained thick pus.   Before the surgical landmarks could be located there was a spasmodic gasp, and artificial respiration soon restored animation and the child began to cry, thus showing that there was no trouble with the larynx.   An examination of that organ now showed that it was normal and that the obstruction had been lower down and from without.   There had been no unusual fulness of the neck, the outlines were perfect, and examination of the parts after the operation showed the skin and superficial tissues to be normal.   The trachea had been but slightly nicked, and soon healed.   As the patient had been in the operating-room of a diphtheria ward she was given antitoxin and kept in that ward, where she made a rapid recovery, and was discharged, with the wound healed, in about three weeks.

The other cases was that of a man who had had a moderate attack of diphtheria and was almost ready for discharge when a cervical adenitis developed.   This caused great discomfort, and the patient finally complained of great difficulty in swallowing.   A satisfactory examination of the throat was impossible on account of the swelling and tender-

ness at the angles of the jaw. One morning when I saw him he seemed mentally distressed and said he was about to choke. His color was somewhat dusky, but he was able to phonate, although the quality of the voice suggested greatly enlarged tonsils. I saw no cause for alarm, however, and tried to reassure him. Within half an hour I was called to him in great haste and found that he was only gasping. He was immediately intubed, after which he breathed a time or two, but soon coughed and again stopped breathing. The tube was removed and re-inserted; and after each operation the patient breathed two or three times. The trachea was now opened and found to contain pus. After the tracheotomy tube was in place and the trachea had been feathered out the patient breathed freely and spat out considerable bloody pus. Consciousness returned and the patient became very comfortable. A satisfactory examination of the throat was still impossible and never advisable during life. The tracheotomy tube was omitted on the third day, and respiration was unimpeded. The patient continued very ill, however, but made no special complaint, and died two days later. The autopsy showed that the glands in the neck had broken down and there was the site of a post-pharyngeal abscess, which had ruptured very low down; and it was evidently from the effects of this that the patient had suffered at the time that tracheotomy was performed. There was no pneumonia, but there was an extensive and general peritonitis.

Experience gained from treating this series of 1962 cases and from the observation of many other cases of diphtheria, as well as from the teaching of Dr. McCollum, leads to the overwhelming conviction that primary tracheotomy no longer has a place in the treatment of simple diphtheritic laryngeal stenosis.

TABLE VII.

Table of 337 cases of laryngeal diphtheria, 213 of whom were intubed, showing the distribution by age and by sex, with the mortality percentages.

Ages in years.	Males.			Females.			Totals.		
	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.
0 to 1 .	9	4	44.4	5	4	80.0	14	8	57.1
1 " 2 .	21	15	71.4	29	12	41.3	50	27	54.0
2 " 3 .	29	11	37.9	20	10	50.0	49	21	44.8
3 " 4 .	37	9	24.3	24	9	37.5	61	18	29.5
4 " 5 .	29	5	17.2	24	8	35.0	53	13	24.5
5 " 6 .	20	4	20.0	19	2	10.5	39	6	15.3
6 " 7 .	15	4	26.6	14	2	14.2	29	6	20.6
7 " 8 .	7	...	......	17	2	28.5	14	2	14.2
8 " 9 .	4	...	......	0	0	......	4	0	
9 " 10 .	2	...	......	2	1	50.0	4	1	25.0
10 " 11 .	2	...	......	3	0	......	5	0	
11 " 12 .	0	...	......	0	0	......	0	0	
12 " 13 .	0	...	......	1	1	100.0	1	1	100.0
13 " 14 .	0	...	......	1	0	......	1	0	
14 " 15 .	1	...	......	0	0	......	1	0	
Over 15 .	4	...	......	8	3	37.5	12	3	25.0
Totals .	180	52	28.8	157	54	34.3	337	106	

TABLE VIII.

Table of 213 cases of laryngeal diphtheria in which intubation was performed, showing the distribution by age and by sex, with the mortality percentages.

Ages in years.	Males.			Females.			Totals.		
	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.	Cases.	Deaths.	Per ct.
0 to 1 .	6	3	50.0	4	4	100.0	10	7	70.0
1 " 2 .	16	14	87.5	21	11	52.3	37	25	67.5
2 " 3 .	21	10	47.6	16	10	62.5	37	20	54.0
3 " 4 .	26	9	34.6	17	8	47.0	43	17	39.5
4 " 5 .	16	5	31.2	16	7	43.7	32	12	37.5
5 " 6 .	12	4	33.3	8	1	12.5	20	5	25.0
6 " 7 .	12	4	33.3	5	2	40.0	17	6	35.2
7 " 8 .	6	...	......	4	2	50.0	10	2	20.0
8 " 9 .	3	...	......	0	...	......	3	1	33.3
9 " 10 .	1	...	......	2	1	50.0	3		
10 " 11 .	0	...	......	0	...	......	0		
11 " 12 .	0	...	......	0	...	......	0		
12 " 13 .	0	...	......	1	1	100.0	1	1	100.0
13 " 14 .									
14 " 15 .									
Over 15 .									
Totals . .	119	49	41.1	94	47	50.0	213	96*	45.0

The preceding tables (Tables VII. and VIII.) show the distribution by age and by sex of this series of 337 cases of laryngeal diphtheria as a whole, and also of the 213 cases that were intubed separately.

COMPLICATIONS. The complications that may arise during an attack of diphtheria in addition to those of the heart, kidneys, and lungs, already mentioned, are many; but the most important are the glandular enlargements, acute middle-ear disease, and post-diphtheritic paralysis. Tonsillitis and peritonsillar abscess due to infection of the tissues with various pyogenic bacteria sometimes occur during convalescence. Delirium, sometimes active and sometimes of the low, muttering type, may occur during the acute toxic period of the disease. It is more frequent in those laryngeal cases in which the trachea and bronchi are filled with thick, tenacious mucus and the patients die from toxæmia during the first few days; but it may occur in cases of simple pharyngeal diphtheria, and is occasionally seen in those patients with a high initial temperature, and usually disappears as the latter subsides.

Vomiting as an initial symptom sometimes occurs, and was said by those giving the histories to have been noticed in 531 instances in this series of cases, or in 27 per cent. of the entire number. This symptom during convalescence is usually of bad import, and is frequently due to nerve degeneration. When it occurs in a patient whose heart is irregular or who presents other evidence of nerve degeneration it is always a danger signal, and is often the beginning of the end.

* Thirty-seven died within twenty-four hours of admission.

An examination of the cervical and submaxillary glands at entrance showed that in this series of 1962 cases they were more or less enlarged in 1058 cases, or in 53.9 per cent. of the entire number.   In 965 cases the enlargement was slight or moderate, the glands varying in size from that of a pea to that of a walnut.   In 93 cases, however, they were greatly enlarged, often completely obliterating the outlines of the jaw and chin ; and some of these were sent to the hospital as cases of diphtheria and mumps, although the adenitis was confined to the glands mentioned.   A secondary glandular enlargement occurred in 134 instances, or in 6.8 per cent. of the cases ; and in 31 of these cases only was incision necessary.   By secondary glandular enlargement is meant one not accompanying the acute stage of the disease, but occurring during the secondary stage, and probably not directly due to the diphtheritic process.   It is usually due to an infection of the now vulnerable tissues with pyogenic organisms.   Sometimes an early application of cold by means of an ice-collar is sufficient to allay the process ; but if the tissues soften and there is evidence of pus they must be incised and drained.   The pus is usually contained in the glandular capsule, and curetting is, therefore, not necessary.   Experience teaches that general surgical principles must find an exception here, and the incision made should be small.   The injury to the skin is slight, and the scar formed is often almost imperceptible and entirely escapes casual observation.

Middle-ear disease was not a frequent complication, and occurred in 61 cases only, or in 3 per cent. of the entire number.   In 31 cases the left ear only was affected ; in 15 cases the right ear only, and in 15 cases both ears were affected.   In one case in which both ears were affected the mastoid cells on the left became involved, and an operation for the relief of that condition was performed by Dr. Leland.   The patient was an underfed foundling, who came to the hospital with diphtheria and suppurating ears ; but after a residence of ninety-seven days in the hospital he was discharged well and in good condition.   In only three cases was there complaint of aural pain.   In two of these bulging membrana tympani were found, and paracentesis was performed ; the other yielded to treatment without incision.   In the remaining 58 cases the tympanic membranes ruptured spontaneously and without pain, and the discharge was usually purulent from the first.   The bacilli of diphtheria were found in the discharges in 6 cases, but the common pyogenic organisms were the usual bacteria present.   The absence of pain, the spontaneous rupture of the membrana tympani, and the purulent character of the discharge suggest a subacute rather than a really acute process.   It usually yielded promptly to treatment, especially when the patient was improving, and as convalescence advanced, although in a few cases the discharge continued until the patient had entirely recovered from his attack of diphtheria.

The fact that the toxin of diphtheria possesses a powerful destructive property for nerve tissue has been pointed out by Thomas[21] and others. The amount of harm done this tissue varies greatly, and the clinical manifestations of the changes produced are not always commensurate with the *apparent* severity of the attack of diphtheria. It is probable, however, that the attention of the busy clinician is attracted only by those cases in which the changes are well marked. Beside the cardiac disturbances already mentioned that may be due to nerve degeneration, post-diphtheritic paralysis is frequent, but much less common than before antitoxin was used. Of the various paralyses that may occur palatal paralysis is the most common, and occurred in 72 of the patients of this series, and there were, in addition, other patients whose voices assumed an unnatural nasal quality. There were 19 cases of oculomotor paralysis, resulting in all varieties and degrees of strabismus; and 6 recorded cases of diplopia, although it is probable that this symptom was more frequent, as many of the patients were very young. There was 1 case of paralysis of one deltoid muscle; 1 case of hemiplegia; 2 cases of peculiar nervous twitchings of the fingers, hands, arms, and shoulders, and 1 comparatively mild case of acute chorea. The patellar reflexes were diminished in many cases and absent in a few cases; but complete records of such changes, unfortunately, were not kept. There were two cases of acute neuritis during the active stage of the disease, and two patients returned to the hospital for advice with beginning peripheral neuritis, one three weeks and the other six weeks after discharge.

The degenerative changes produced by the toxin of diphtheria are by no means confined to the nervous system. In those severe and prolonged cases which finally result in death, and in many similar cases that are saved by patient nursing and careful feeding, there are clinical evidences of profound changes in all the tissues of the body. The skin becomes dry and harsh, the adipose tissue largely disappears, the muscles become soft and flabby and weak; the urine is diminished in amount and contains evidence of changes in the kidneys; the heart is weak and often irregular in action; and the patient is apathetic and somnolent, often sleeping most of the time. This series of changes produces an appearance in the patient that is as characteristic of severe and late diphtheria as is the peculiar symptom complex of typhoid fever that is termed " typhoidal." The pathological findings in those cases that come to autopsy are in accord with these clinical observations.

FATAL CASES. As already stated, 240 of this series of cases died. Attention has also been called to the fact that there was an unusually large number of cases of diphtheria in Boston during the time covered by this study. From August 1, 1899, to August 1, 1900, 3697 cases

of diphtheria were reported to the Board of Health, and 2095* of these were treated in the hospital. It is well known that the worst cases and the neglected cases are the ones usually sent to hospitals. As a proof that this series of cases is not an exception to the rule, I have made inquiry of the various physicians who have reported cases of diphtheria to the Board of Health, and find that only 44 cases of laryngeal diphtheria were treated outside the hospital ; whereas 356† cases of laryngeal diphtheria were treated in the hospital. In other words, 56.6 per cent. of the cases of diphtheria in Boston were treated in the hospital, and 89 per cent. of the cases of the laryngeal type, the most fatal form of the disease, were treated in the hospital.

Many patients were sent to the hospital only when the attending physician assured the parents that further home treatment was useless, and the only chance of recovery was with hospital care ; and many such cases were not seen by the physician until the disease had reached this stage. It, therefore, happened that many moribund cases were admitted to the hospital, and 69 of them died within twenty-four hours of admission—that is, 28.5 per cent. of the deaths occurred in patients admittedly too far advanced in the disease to respond to treatment. In addition to these 69 cases 103 others died from the toxæmia of the disease, and all but 9 of them within ten days of admission. There were 54 patients who died from the degeneration of the various tissues, or the effects of such changes, and late in the disease, and 14 patients who died from pneumonia as a complication of the diphtheritic process. In other words, 172 patients, or 71.6 per cent., of the fatal cases died during the acute stage of the disease, and 54 patients, or 22.5 per cent., of the fatal cases died during the secondary stage of the disease ; and 14 patients, or 5.8 per cent., of the fatal cases died from the effects of diphtheria plus another disease, probably not caused by the diphtheria and without which they might have recovered.

This classification of deaths seems the only rational one possible, and it has the advantage of avoiding the various terms descriptive only of a part of the condition. The cause of death in all the cases was diphtheria ; and all patients dead of that disease show more or less changes in all the principal tissues of the body ; and those changes vary principally in extent and duration, and not essentially in character. It is not consistent with the facts to say that a patient dies from nephritis when his kidneys are but little more affected than his heart or his nervous system if all the changes are due to a common cause ; nor is it true that patients die from heart failure or nerve degeneration when all the other tissues of the body are alike affected by the same destructive agency. The terms heart failure and nerve degeneration are inadequate and not

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* This number includes the 131 cases of mixed infection yet to be considered.
† Including mixed cases.

applicable in a disease caused by so diffusable and non-selective a poison as is the toxin of diphtheria.

MIXED INFECTION. Mention has already been made of the fact that the total number of cases of diphtheria admitted to the hospital during the time covered by this study was 2093, and that 131 cases proved to have a mixed infection. The cases of mixed infection are interesting in this connection chiefly to show that simultaneous infection with diphtheria and scarlet fever is not an uncommon occurrence. All of the 131 cases had perfectly characteristic and usually severe attacks of diphtheria; and the bacilli of diphtheria were found in cultures from all but three, and two of these coughed up casts of diphtheritic membrane from the trachea, and the other had large patches of diphtheritic membrane on the tonsils and a nasal discharge such as occurs only in diphtheria. In 15 cases there was a history of exposure to scarlet fever before admission, and in a few other cases, possibly ten, there was something in the appearance of the throat or tongue that aroused suspicion and led to the isolation of the patient at entrance. In the majority of cases, however, there was nothing in the appearance of the patient when admitted to suggest a double infection. None of these 131 patients was exposed to scarlet fever while in the hospital, and the usual time that elapsed between admission and the appearance of the first symptoms of scarlet fever was three or four days, although in some cases only one day intervened, and in the case of one patient whose brother was in the scarlet fever ward an isolation of ten days was necessary, and in a somewhat similar case a patient was isolated twelve days before the diagnosis of scarlet fever was possible. In some cases in which the first symptoms of scarlet fever were delayed six or seven days the throat had entirely cleared before the appearance of the sore-throat of scarlet fever. Of the 131 cases of mixed infection 19 had laryngeal diphtheria, and 13 of these were intubed. The death-rate in mixed infection is always high; and of this series of 131 cases 41 died, giving a death-rate of 31.3 per cent. But mortality percentages based on so small a number of cases are of little value.

TREATMENT. Diphtheria combines in a peculiar manner problems that are alike of interest to both physician and surgeon; and the proper treatment of the disease demands the wisdom and skill of both. It is the disease *par excellence* of which the etiology, morbid processes, and cure are known, and the complications that may arise during its progress are varied and interesting. It is true that our knowledge is yet imperfect and incomplete; but it is already sufficient to place the disease in a class by itself. It must be considered as an entity; and the various changes noted regarded as different manifestations of a common cause. That cause is a known and destructive poison; but fortunately we have found and are able to produce its antidote. In

its treatment, therefore, aside from the complications that may arise, the problems with which the clinician is confronted relate solely to the amount of toxin absorbed into the system of the patient, the suscepti-bility of the individual patient to the toxin absorbed ; and the means to be employed in neutralizing this toxin in the system, and in fortify-ing the patient to withstand the effects of the toxin that has already produced its destructive effects.   In antitoxin we have a remedy which possesses the power of perfectly neutralizing the toxin, and the recovery of the patient depends almost entirely on whether or not this remedy is administered early enough and in sufficient quantity.   Unfortunately there is no way in which a definite knowledge of the amount of toxin absorbed by a given patient can be obtained.   The number of the bacilli of diphtheria infecting a patient cannot be determined, and, moreover, the virulence of these bacilli varies within wide limits.* The susceptibility of the individual is also an unknown quantity.   It is therefore impossible to determine *a priori* the amount of antitoxin required in a given case.   Here, as in many conditions, we have to rely on clinical observation.   Laboratory experiments with the toxin of diph-theria are of but little help to the clinician, for in the laboratory known qualities are dealt with, while at the bedside the quantities are unknown and unknowable.   The amount and character of the diphtheritic mem-brane, however, the quality and frequency of the pulse, the expression of the face and eyes, and the general appearance of the patient aid in forming an opinion.   The amount of diphtheritic membrane alone is an imperfect guide ; and it is often necessary to continue giving anti-toxin after this has disappeared, for evidences of toxæmia sometimes outlast the false membrane.   At best it is impossible to determine accurately how much toxin has been absorbed and how much harm done before it has been neutralized ; and we therefore say that diphtheria is a treacherous disease and always give a guarded prognosis.   Clinical experience teaches, however, that the effects of antitoxin are only salutary, and there is no danger in giving too much.   Clinical ex-perience also teaches that the sooner the total amount of antitoxin required can be given the better.   At the hospital, therefore, we give 4000 unit doses and repeat every four hours as long as may be neces-sary.   In some exceptionally severe and late cases I have given 4000 units every two hours and in some cases 8000 units every four hours. This method does not allow time for marked change in the false mem-brane between the doses ; but, as already stated, the appearance of the

* Theobald Smith has shown that by special methods of cultivation the toxin-producing power of any diphtheria bacillus may be greatly increased. He says, " I have thus far increased the toxin production of two diphtheria bacilli by a combination of the methods outlined, so that the minimum fatal doses of 0.04 c.c. and 0.05 c.c. for a guinea-pig of 250–300 grammes, as obtained by the method of Spronck, have been reduced to 0.007 c.c. and 0.015 c.c. respectively." —Journal of the Boston Society of Medical Sciences, June, 1899, vol. iii., p. 318.

membrane is but one of the many signs and symptoms to be considered. Some patients have thus received large quantities of antitoxin, and some moribund and apparently hopeless cases have been saved from death. Some of the recoveries that have attended this mode of treatment have been so wonderful that only those who have seen them can appreciate them ; and if the cases were reported here in detail the writer would probably be pronounced an irresponsible enthusiast. I believe, how-ever, that the logical conclusions deducible from the statistics gathered from a study of this series of cases and from comparison with other statistics of large numbers of cases studied before antitoxin was used cannot be other than favorable to this mode of treatment. The death-rate from diphtheria in the Boston City Hospital for four years and one month previous to February 1, 1894, and for the last series of cases treated without antitoxin, was 45.3 per cent. The death-rate for this series of cases comprising those treated in the same institution during an entire year is 12.23 per cent.—that is, the death-rate has been lowered 33 per cent. Not all of the patients of this series of 1962 cases received large amounts of antitoxin. The dose was not repeated unless neces-sary ; and there were 321 patients who received only one dose of 4000 units or less during their illness.

In writing of diphtheria before antitoxin was used Osler[22] says : " No disease of temperate regions proves more fatal to nurses and phy-sicians." Yet during the existence of the present contagious depart-ment of the Boston City Hospital, during all of which time antitoxin has been used, more than 7000 cases of diphtheria have been treated and more than 100 nurses, physicians, and employés of the department have contracted the disease, and there has not been a death among them.

This series of cases has afforded an exceptional opportunity for study-ing the effects of antitoxin on early diphtheritic membrane. Many of the cases came under my personal observation, and I have repeatedly seen the false membrane extend and thicken even after three or four 4000-unit doses of antitoxin had been given ; and then rapidly disap-pear when double that amount had been given, the patient making a rapid and uncomplicated recovery.

The earlier cases of this series of hospital attachés were ill, on the average, much longer than the later ones ; for the dose of antitoxin is at present more than double what it was four years ago, and the inter-vals between the doses are much shorter.

The use of antitoxin is often followed by an eruption of urticaria or erythema multiforme, or a combination of the two, and rarely by pains in the joints. These sequelæ are probably due to the serum containing the antitoxin, and are somewhat annoying and often perplexing, for some of the antitoxin rashes at an early stage resemble the eruption of scarlet fever ; and there is sometimes a rise of temperature before the

appearance of its cause. The arthralgia is not due to inflammatory processes, and is usually of short duration, occurring more frequently in adults than in children. It is sometimes severe, and the use of morphine may be necessary in its treatment. These disturbances are never dangerous, and are usually of short duration.

The value of alcoholic stimulation in diphtheria is so well known and generally accepted that it need not be dwelt upon here. I wish to emphasize the fact, however, that it should be used freely and frequently, and sufficiently early in the disease to ward off if possible the attacks of extreme weakness and collapse that are not uncommon in those patients whose tissues are undergoing degenerative changes. A rapid pulse is not a contraindication, and, generally speaking, the amount of toxæmia or evidence of degenerative changes are better guides in its use than the pulse.

Considering the fact that the heart-muscle becomes flabby and shows more or less evidence of fatty degeneration early in the disease, the use of digitalis is indicated only in exceptional cases.

Hot packs have been of especial value in those cases showing diminished urinary secretion, and drachm doses of a saturated solution of magnesium sulphate given every hour has proven of value as a diuretic in children.

All intubed patients are fed by means of an œsophageal tube ; and it has been found better to feed them in a partially sitting posture, supported by the nurse, as this method is less liable to give rise to inhalation pneumonia.

In many cases, both of adults and of children, in which vomiting has been an annoying and persistent source of danger, rectal feedings have been of great assistance. The rectum in children is surprisingly tolerant of such treatment, provided only that the quantity given is not too large and care is exercised in its administration, and also that the feedings are given only once in six hours.

Symptoms as they arise must be the guide for the further treatment. But the physician must constantly bear in mind the character and the extent of the degenerative changes possible in this disease, and exercise the utmost care and caution in allowing his patients to sit up and walk about. The heart is usually a reliable guide in this, and if it is not affected by a short time out of bed the time up each day may be gradually lengthened. The custom of allowing patients to sit quietly in a chair fifteen minutes on the first day out of bed is followed at the hospital, and they are not allowed to walk to and from the chair.

CONCLUSION. The statistics and clinical observations presented in this study seem to allow certain logical conclusions and obvious deductions that it is hoped will be of service to those who have to deal with this terrible yet fascinating disease. There can be no disease more

terrible than one which, uncontrolled, is capable of entering the home of the poor and the rich alike, and leaving the hearthstone desolate with only the bereaved parents, where once the happy voices of many children were heard. There can be no disease more fascinating than such a one as this over which science and the skill of the clinician have so nearly gained complete control. Yet during severe epidemics diphtheria formerly often claimed every child of a household as its victim. This series of cases, on the other hand, contains three and four and five members of some families, all of whom were discharged well. It is not an uncommon occurrence to have all of the children of a family under treatment in the hospital at the same time. It sometimes happens that one of the number dies ; and the fatality almost invariably occurs in the first member of the family to contract the disease and the one from whom the others were infected. The poor and ignorant often fail to call a physician until it is too late for him to be of service to the child for whom he is called. But if the disease is diphtheria he often finds other children of the family also ill and their condition not recognized by the parents ; and he may be in time to save their lives. The value and importance of an early diagnosis and prompt treatment are thus emphasized almost daily in any large hospital devoted to the treatment of this disease. The amount of toxin absorbed by a given patient is estimated with difficulty, and the rapidity with which it acts on the tissues of the body probably varies greatly ; but when the nature and extent of the degenerative changes possible as a consequence of severe diphtheritic intoxication are considered there can be no doubt of the advisability of neutralizing the toxin in the shortest possible time. Clinical experience teaches that this can best be done by giving antitoxin early, in large doses, and at frequent intervals. When the nature and extent of the degenerative changes are considered the reasons for continued and prolonged rest in bed are also obvious, and the duty of the physican is plain. The various complications that may arise demand an untiring vigilance, but usually suggest their own treatment.

I wish to express my grateful appreciation of the character and quality of the work that has so long been done by Dr. McCollum, and of his untiring energy as a teacher. I also wish to thank him for his many personal kindnesses to me during my service at the Boston City Hospital, and especially for the patience and careful persistence with which he has led me into a knowledge of contagious diseases.

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OBSERVATIONS ON THE CHARACTER OF THE CELLS IN THE EXUDATION IN ACUTE INTERSTITIAL NEPHRITIS, WITH SPECIAL REFERENCE TO THE PRESENCE OF CELLS WITH EOSINOPHILIC GRANULATIONS.

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In 1897 Councilman[1] reported nine cases of acute interstitial nephritis, of which four occurred in individuals dead from scarlet fever, one from diphtheria and scarlet fever, two from diphtheria, one after criminal abortion, and in one case the initial lesion was unknown.

Councilman described the initial lesion as being an accumulation in the interstitial tissue of the organ of cells in every way similar to those seen in hyperplasia of connective tissue. Some of the cells he regarded as leucocytes, but they seemed to be derived in large part from the endothelium of the small veins and capillaries, but not from that of the arteries.

The cells of the connective tissue of the glomerular capsules were also said to take part in the process.   The interstitial cell increase was both general and focal. A variable amount of degeneration of the renal epithelium was noted ; but that was not regarded as the primary lesion, and was attributed in part at least to the pressure exerted by the cells in the interstitial tissue.

Cultures were made in five of the cases, and in all there was a general infection with the streptococcus, and in one case the diphtheria

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[1] THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, vol. civ.

bacillus was also found. Œdema was absent and there were no symptoms pointing to disease of the kidneys.

In a second and more elaborate article on the subject in 1898, Councilman[1] states that in two and a half years he found 42 cases of acute infectious diseases in which acute interstitial nephritis was present. Of these cases 24 were diphtheria, 5 scarlet fever, 5 diphtheria and scarlet fever, 2 diphtheria and measles, 1 measles and whooping-cough, 1 empyema with subsequent diphtheria, 1 lobar pneumonia and pericarditis, 1 epidemic cerebro-spinal meningitis, 1 lobar pneumonia, and 1 acute endocarditis following abortion. Presumably the later series includes the nine cases mentioned in his first article. Bacteriological investigation of the kidneys resulted as follows:

In the 29 cases of pure diphtheria the kidneys were sterile in 6, the colon bacillus occurred in 11, the streptococcus pyogenes in 5, the B. diphtheriæ in 8, B. fœtidus in 1. In 5 cases of pure scarlet fever B. coli was found in 2, the streptococcus in 3, and the staphylococcus aureus in 1. Of 8 cases of mixed diphtheria and scarlatina and measles 2 were sterile, the streptococcus occurred in 3, and B. coli in 3. In the remaining 6 cases B. coli occurred in 3, the staphylococcus aureus in 2, the streptococcus in 4, the pneumococcus in 1, and 1 case was sterile. Bacteria were not found in hardened sections of the kidneys.

As the result of these observations Councilman concludes that "we cannot lay any weight on the presence of bacteria in the kidney as a constant factor in the acute interstitial lesion."

Beside the forty-two cases associated with general diseases, Councilman found three others in which the interstitial process was due to the local action of bacteria.

In the first case—one of ascending ureteritis and pyelonephritis—cultures gave B. coli and streptococci. About the necrotic areas there was an "intense infiltration of the tissues with plasma cells." These cells were also present in the surrounding vessels.

In the second case there were multiple small, hæmatogenous renal abscesses, secondary to carbuncle of the neck and thrombosis of the lateral sinuses, with the staphylococcus aureus in pure culture. In the typical abscesses there were micrococci, a mass of pus cells, and nuclear detritus. Outside of the abscesses there were a number of large epithelioid cells, many of which contained micrococci and other cells, and outside of this cell layer there was an intense infiltration with plasma cells, which were also present in the bloodvessels.

In the third case—one of scarlatina with abscess beneath the scalp and general infection with the staphylococcus aureus—there was general interstitial nephritis and small abscesses with surrounding plasma-cell infiltration.

[1] Journal of Experimental Medicine, 1898, vol. iii., Nos. 4 and 5.

In this article Councilman gives an extensive review of the literature of acute interstitial nephritis. It is neither profitable nor advisable to repeat this in the present paper, but I will refer the reader to Councilman's article. He shows that acute interstitial nephritis was first described in a case of scarlatina by Biermer in 1860. Since then it has been described by a number of authors as occurring chiefly in scarlatina, diphtheria, typhoid fever, and acute infections. Some authors regard it as the most characteristic lesion of scarlatinal nephritis.

A review of the articles quoted by Councilman shows that the cells in the interstitial process have been regarded as lymphocytes by Biermer, Wagner (who describes the process as "lymphomatous nephritis"), Klebs, Coats, and Klein. Litten and Von Kahlden called them leucocytes. They are referred to as "round cells," or "small round-cell infiltration," by Weigert, Waller, Dunin, Fischl, Friedlander, Neuwerck, Langhans, Litten, Oertel, Sörensen, Baginsky and Stamm, Bernard and Felsenthal, and Rosenstein. Kelsch regards them as embryonic in character.

Coats and Neuwerck believe that they are derived from the bloodvessels, while Crooke states that they are derived from the blood as well as from proliferation of the endothelium of the capillaries. Orth states that the interstitial cells are not similar to leucocytes, and have a round, vesicular nucleus. He thinks they are derived from connective-tissue cells, but says their relation to the small veins speaks in favor of emigration.

Councilman defines acute interstitial nephritis as "an acute inflammation of the kidney, characterized by cellular and fluid exudation into the interstitial tissue, accompanied by but not dependent on degeneration of the epithelium ; the exudation is not purulent in character, and the lesions may be both diffuse and focal."

The foci are found chiefly in three places—the boundary zone of the pyramids, the subcapsular region of the cortex, and around the glomeruli. In some cases the bloodvessels of the boundary zone contain numbers of lymphoid cells and plasma cells. Councilman gives a clear description of the cells in the interstitial tissue and identifies them with Unna's plasma cells, of which he gives an historical sketch. He agrees with Marschalkó, that these cells are derived from lymphocytes. He states that the plasma cells in the interstitial tissue come partly from the bloodvessels, through the walls of which their passage can be traced, and partly from mitotic division of the emigrated cells. The latter may emigrate, either as lymphoid cells or as plasma cells. Variable numbers of both of these varieties of cells are found in the bloodvessels. The interstitial cells lie in larger and smaller groups between but never in the tubules, upon which they often exert considerable pressure. Councilman found nuclear figures in plasma cells in the bloodvessels as

well as in the tissues, where they were often very numerous. In marked cases other kinds of cells were found in the interstitial tissue. Of these the most common were lymphoid cells, the transition of which into plasma cells could often be traced. " Polynuclear leucocytes " (presumably neutrophilic, but whether neutrophilic or eosinophilic is not stated) were " usually present in variable numbers, depending upon the degree of degeneration of the epithelium."

In addition to these varieties, in a few instances, large phagocytic cells of the epithelioid type were seen. Councilman believes these cells to be derived from the tissue cells. They may contain red blood-cells, leucocytes, and plasma cells. The epithelium showed cloudy swelling and fatty degeneration in variable degree, and in some cells vacuoles and globular hyaline masses were found. Some tubules were markedly dilated and some entirely destroyed. There were usually no glomerular changes, although acute interstitial nephritis was sometimes met with as a complication of typical glomerulo-nephritis. Leucocytes were sometimes found in the tubules.

SUMMARY. The cells in acute interstitial nephritis have been described by various authors as "lymphoid cells," " small round-cell infiltration," " leucocytes," and have been thought to have their origin in (1) the bloodvessels (emigration), (2) proliferation of the vascular endothelium, (3) from the fixed connective-tissue cells of the part. Councilman, the latest and most exhaustive writer on the subject, finds the most numerous cells to be the plasma cells, but finds that lymphoid cell (lymphocytes) and polynuclear leucocytes are also present in variable numbers.

These cells are all derived from the bloodvessels, whence they emigrate into the interstitial tissue. He traces the origin of the plasma cells from lymphocytes, and for the first time demonstrates their active mitotic division in the tissues and bloodvessels. He also points out their highly developed amœboid activity. Councilman further describes the presence of large epithelioid phagocytic cells.

REPORT OF CASES. During the last two years, in the routine examination of my autopsy material, I have met with the following cases of typical acute interstitial nephritis :

CASE I. *Summary : General streptococcus bacteriæmia after abortion ; marked acute interstitial nephritis, with large numbers of plasma cells ; polymorphonuclear eosinophiles and a few lymphocytes in the exudation.*— M. A., female, aged thirty-five years, entered Lakeside Hospital, December 7, 1898, and died the next day. There was a history of recent abortion. There were no symptoms pointing to the kidneys.

Autopsy, Sixteen Hours after Death. Anatomical diagnosis : Ulcerative stomatitis, acute pharyngitis, laryngitis, bronchitis, and bronchopneumonia, congestion and œdema of the lungs ; acute interstitial nephritis, fatty degeneration and cloudy swelling, with bile pigmentation of the

liver and kidneys. Acute splenic tumor, syphilitic cirrhosis of the liver. Retained placenta after abortion. Streptococcus bacteriæmia. Infection of the uterus with the streptococcus and B. mucosus capsulatus. Gaseous emphysema of the gall-bladder, due to B. aërogenes capsulatus.

The kidneys were enlarged, the right weighing 370 and the left 330 grammes. The capsules were readily removed; the surfaces were smooth, but deeply stained with bile-pigment. On section, both organs presented the same appearances; they were markedly œdematous and congested, and a large amount of serum and blood escaped on section. The cortices were thickened, averaging 1 cm. in thickness, and denser than ordinary. The glomeruli were inconspicuous. The cut surface was pale and opaque. The medullary as well as the cortical portion was deeply stained with bile-pigment. The pelves, ureters, and vessels were normal. The adrenals were normal.

The description of the other organs is without present interest.

Cover-slips from the uterus and lungs showed streptococci in short chains. Aërobic agar plate cultures from the lungs, pleura, spleen, and kidneys showed the streptococcus pyogenes in pure culture; those from the uterus showed the streptococcus and B. mucosus capsulatus. Cover-slips and animal experiments from the gaseous emphysema about the gall-bladder showed B. aërogenes capsulatus.

Histological Examination of the Kidneys. Portions of the various organs were hardened in Zenker's fluid, embedded in paraffin, sectioned, and stained in hæmatoxylin and eosin and in eosin and Unna's alkaline methylene-blue.

Kidneys. Glomeruli: The capillaries are dilated and contain large numbers of red blood-cells and occasional polymorphonuclear eosinophiles and plasma cells. No changes can be made out in the capillary walls. The capsular epithelium of the glomeruli is swollen, granular, and occasionally desquamated. Bowman's capsules are unchanged. The epithelial cells of the convoluted tubules are swollen and granular and desquamated in many places. Some tubules contain coarsely granular material, which stains intensely with eosin. In the convoluted tubules a few of the epithelial cells contain nuclear figures. Some tubules contain many cells.

There are everywhere signs of marked œdema of the interstitial tissue. The most marked changes are seen in the interstitial tissue between the tubules and along the course of some of the arteries and veins. About many of these, especially the interlobular vessels near the medulla and in the intermediate zone, the adventitia coat and the perivascular fibrous tissue are infiltrated with large numbers of cells—plasma cells, lymphocytes, large mononuclear leucocytes, and polymorphonuclear and mononuclear eosinophiles (Fig. 1). The proportion between the various cells varies greatly, but in general the plasma cell is the most numerous cell, and often there are large numbers of eosinophiles. In some places these latter form at least one-third of the cells present and in others they are the most numerous cells in the exudation. The same cells are often seen in the media of small arteries and veins, the lumina of which commonly show larger and smaller numbers of the same cells. Plasma cells and eosinophiles are often present in large numbers in the intertubular capillaries, and sometimes also in the glomerular capillaries. No endarteritis is to be found. The bloodvessels in general contain variable numbers of plasma cells and eosinophiles. Scattered

throughout the cortical portion of the organs, often in association with
the arteries and veins, as above described, but often at a distance from

FIG. 1.
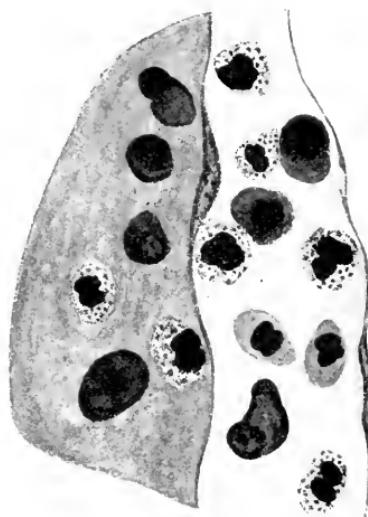
Capillary and surrounding tissue, showing plasma cells, large mononuclear leucocytes, and
eosinophiles.   The last named are distinguished by their granular protoplasm.

FIG. 2.
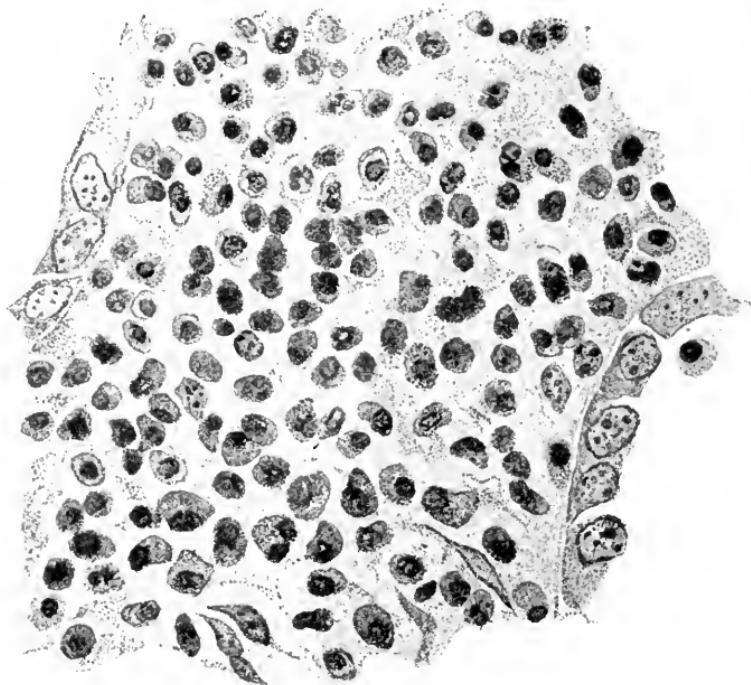
Intertubular exudation of plasma cells, mononuclear leucocytes, and eosinophiles.
The cells with coarsely granular protoplasm are eosinophiles.

these, there are a large number of areas of intertubular cellular infiltration. Here the tubules are compressed to a greater or lesser degree, and are often entirely obliterated. These areas are very numerous in the peripheral portion of the cortex, but are most numerous near the medulla. In general, the cells of these areas are of three kinds—plasma cells, lymphocytes, and eosinophiles—while large mononuclear leucocytes are sometimes seen (Figs. 2 and 3).

The plasma cells are sometimes round, sometimes oval or long oval, and often very much elongated. Judging from their shape, many had evidently been actively motile. Their nuclei are distinctive, with well-marked rim, from which often projections extend into the interior of the nucleus, where in many cells densely staining chromatin masses were seen. In most cells the nuclei are placed eccentrically. The cytoplasm usually, but not invariably, stains a bluish hue with the methylene-blue. In some places transitional forms between lymphocytes and plasma cells are seen in both the bloodvessels and the tissues. In some cells there are two, and in a few even three, nuclei. Mitotic figures are often seen in the plasma cells.

FIG. 3.
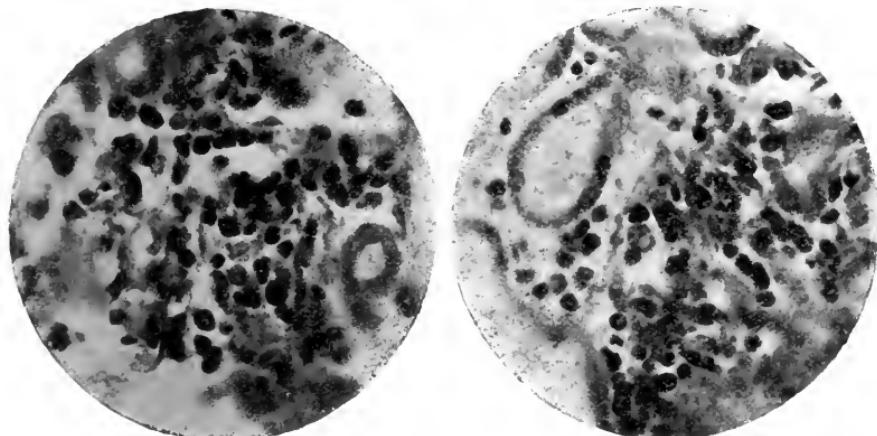
Photomicrographs showing intertubular exudate.

The eosinophiles of the bloodvessels as well as of the tissues are almost invariably of the polymorphonuclear type, with coarse, eosinophilic granulations. Comparatively few mononuclear forms are present. No transitional forms between mononuclear leucocytes, lymphocytes, or plasma cells are found. The eosinophiles in the kidneys in this case were evidently brought there by the blood and were not formed locally. The cells in the areas of the infiltration were evidently derived from the bloodvessels—a true exudation. No bacteria were found in sections of the kidney.

Case II. *Summary: Unsuspected acute interstitial nephritis, with plasma cells and mononuclear and polymorphonuclear eosinophilic leucocytes in the intertubular exudation; tuberculosis of the bronchial glands, with eosinophiles in the tubercular tissue; prolapsus uteri; abortion; vaginal hysterectomy.*—Mrs. E. C., white, aged thirty years, was admitted to Lakeside Hospital, service of Dr. Hunter Robb, December 10, 1898, exhibiting labor pains. She had had measles and malaria some time

before. She had had prolapsus uteri for some time. She has one child, aged five years; aborted at the fifth month about two years ago, and had a full-term child fourteen months ago. Her urine examined on the day of admission was straw-colored, with specific gravity 1018, and free from albumin and sugar. In the slight sediment there were amorphous urates, a few epithelial cells, and some leucocytes. A blood-count made December 19th showed 3,950,000 red blood-cells and 24,000 leucocytes per c.mm. A differential count of the latter was not made.

Operations. December 19th, curettement and irrigation of the uterus to remove abortion remnants. December 28th, vaginal hysterectomy with removal of the right ovary and tube. Convalescence was uninterrupted until her sudden death, eighteen days after the last operation, and the day before the one set for her discharge from the hospital.

Anatomical diagnosis: Hypoplasia of the cerebellum, cyst of the pia arachnoid at the base of the brain. Acute interstitial nephritis; small stitch abscess of pedicle.

Cover-slip preparations and plate cultures from the various organs, including the kidneys, were negative. From a small stitch abscess in the pedicle a few colonies of the staphylococcus aureus grew.

Portions of the organ were hardened in Zenker's and in Orth's fluids and in alcohol. Sections of the kidneys were embedded in paraffin and stained in hæmatoxylin and eosin, and in eosin and in Unna's alkaline methylene-blue. The bronchial glands and the kidneys being the only organs of present interest, a description of the macroscopical and microscopical appearances of the other organs will be omitted.

Kidneys. The right kidney weighed 175 grammes, and measured 11 x 6 x 4 cm.; the left weighed 145 grammes, and measured 10 x 6 x 4 cm., otherwise they were exactly alike.

The capsules were readily removed. The surfaces were smooth and showed numerous irregular, small, pale areas. On section, both organs were markedly congested, but not specially œdematous. In the cortex the glomeruli were inconspicuous. The cut surface was moderately glistening. Scattered through the cortices there were a large number of small, pale, white areas; in these places the consistency was somewhat increased. The medullæ were congested, otherwise normal. The pelves, ureters, arteries, and veins appeared normal.

Microscopical Appearances of the Kidneys. The capsules were somewhat thickened. The glomeruli were normal in appearance. The epithelial cells of the convoluted tubules were granular and in some places contained vacuoles. Scattered throughout the cortex, but best marked at the periphery and in the so-called intermedial zone, there were larger and smaller areas of cellular infiltration. These areas varied from a few to several micromillimetres in size. In general they were round or long and oval in outline. They often surrounded a glomerulus, the capillaries of which are dilated, sometimes thickened, and contained an increased number of cells, some of which were typical eosinophiles. The glomerular spaces were free from cellular or other exudation. There was no desquamation of the capsular epithelium. The cell accumulations were almost entirely intertubular, but in many places cells were grouped about the glomerular capsules. The tubules in these areas were often markedly compressed, and a few were dilated and contained cells similar to those found in the intertubular tissue. There was very little change to be made out in the tubular epithelium, even in the

largest areas of cell infiltration. The plasma cell was the most numerous cell in these areas, but a large proportion of the cells were lymphocytes, and there were a considerable number of large mononuclear leucocytes. In some places there were many typical coarsely granular eosinophiles, some mononuclear, others polymorphonuclear. The capillaries in these areas were usually dilated, often markedly so. They contained large numbers of leucocytes, but few erythrocytes. The proportion between the various kinds of leucocytes was about the same as in the tissues. The plasma cells and eosinophiles often outnumbered the other cells in the dilated capillaries. In some places the capillaries distended by these cells compressed the tubules. Sometimes the perivascular spaces between the tubules and the distended capillaries were crowded with cells similar to those contained in the latter. No nuclear figures were seen in cells in the capillaries. Many of the small veins contain an increased number of leucocytes. The cells in the interstitial tissue evidently came from the bloodvessels. Here and there nuclear figures could be made out in the plasma cells in the intertubular tissue. The proportion of lymphocytes in the capillaries and in the interstitial tissue was greater in this case than in the other two. The adventitia coat and the perivascular tissue of some of the interlobular arteries showed infiltration with plasma cells, lymphocytes, and eosinophiles.

No transition of eosinophiles from plasma cells or mononuclear leucocytes could be traced in this case. The eosinophiles were nearly as numerous in the capillaries as in the interstitial tissue. They certainly were in large part, if not exclusively, brought to the part by the blood-vessels. These cells were very numerous in the interstitial exudation in this case; in some places from ten to fifteen could be counted in a single field of the oil-immersion lens. No eosinophiles could be found in sections of the uterus, ovaries, or tubes. The only other organs in the body in which these cells were found was in a tuberculous bronchial gland, in the lymph-channels and stroma, of which large numbers of eosinophiles were found.

No bacteria were found in the hardened sections of the kidneys.

CASE III. *Summary: Death from bronchopneumonia secondary to otitis media; unsuspected acute interstitial nephritis, with plasma cells, lymphocytes and eosinophiles in the exudation.*—A female child, aged six weeks, died at St. Anne's Hospital, service of Dr. Thomas, after a few days' illness with otitis media and bronchopneumonia. The body was sent to the laboratory for autopsy.

Anatomical diagnosis: Acute bronchopneumonia (slight) of both lungs; otitis media of the left side. Congestion of the lungs, liver, spleen, and brain. Fatty degeneration of the liver. Marked œdema of the kidneys, with acute interstitial nephritis.

Cultures from the lungs showed large numbers of streptococci in pure culture; from the left middle ear streptococci and B. mucosus capsulatus. Cultures from the other organs were negative.

The right kidney weighed 55 grammes, the left 65 grammes. They were of the same general appearance. The capsules were easily removed; the surfaces were smooth. On section, both organs were uniformly very pale, almost white in color. The consistency was soft, and there was extreme œdema. The cortices were swollen. The pelves, cortices, and ureters were normal. No focal changes were discerned on macroscopical examination.

The gross description of the other organs is without present interest.

Kidneys.   Portions of the organ were hardened in Orth's fluid, cut in paraffin, stained in hæmatoxylin and eosin and in methylene-blue and eosin.

Glomeruli : The glomeruli for the most part filled the capsules, which were not thickened.   The glomerular capillaries were often dilated and contained red blood-cells, large mononuclear leucocytes, lymphocytes, and often typical plasma cells.   The epithelial cells covering the capillary walls and Bowman's capsule showed no special changes.   In a few capsular spaces there were a few mononuclear leucocytes and plasma cells and some finely granular material.

Tubules : The epithelial cells of the convoluted tubules showed in places moderate cloudy swelling.   Some of the tubules contained granular material.   Here and there tubules, especially the straight tubules and the tubules of the pyramids, contained larger and smaller numbers of plasma cells, lymphocytes, large mononuclear leucocytes, and occasionally eosinophiles.   In a few places there was desquamation of some tubal epithelial cells.   A few renal epithelial cells showed nuclear figures and contained leucocytes.   There were no focal areas of necrosis.

Interstitial tissue : The interstitial tissue of the cortex showed the most marked changes.   Here the structures were often widely separated, evidently by œdema.   Here and there large and small areas of cellular infiltration of the intertubular tissue were seen.   These areas varied very much in number and extent in different sections ; they were often most numerous in the superficial layer of the cortex ; in other places they were numerous in the intermediate zone.   In still other sections they were rather evenly distributed through the cortical substance.   They were often found about glomeruli, which were, however, unchanged or, at most, were compressed.   These areas of infiltration varied in shape ; about the glomeruli they were usually somewhat crescentic in outline ; when between tubules they were often elongated or oval ; while about branches of the interlobular arteries they were either round or elliptical in shape.   These areas varied very much in size, from a few cells to areas of 100 or 200 micromillimetres in diameter.   These cells lay in the intertubular tissue, in the bloodvessels, and in the media and adventitia coats of arteries.   By far the most common cell in the infiltration was the plasma cell.   A few large mononuclear leucocytes and typical lymphocytes were seen.

There was a variable number of coarsely granular eosinophiles, both in the areas of cellular infiltration and in the capillaries.   These cells usually had densely staining nuclei, which were often trilobate.   In some the nucleus was similar to that of the typical plasma cell.   One elongated cell with eosinophilic granulations had a plasma-cell nucleus at each end of the cell.   Here and there pictures were seen which suggested that eosinophiles had developed from plasma cells, but it was apparent that most of the former had emigrated from the bloodvessels.

In many cells with cytoplasm like that of plasma cells nuclear figures were seen.   Many of the areas of interstitial infiltration were situated about small arteries, afferent and efferent vessels, as well as interlobular arteries.   The same cells described in the intertubular exudation were found in the adventitia and perivascular spaces of the vessels.

The periarterial infiltration was a marked feature of the process.

In the medullary portion of kidneys the capillaries were congested, and here and there small areas of cellular infiltration were found. A few eosinophiles were found in the mesenteric glands, the thymus, and the stroma of the mucosa of the intestines.

In the above cases of interstitial nephritis, two occurring after abortion—in one instance with general streptococcus infection ; in the other no micro-organisms being demonstrated, and in the third bronchopneumonia and otitis media of streptococcus origin—I have been able to confirm in every respect the observations of Councilman on the character and origin of the cells in the interstitial exudation. I have further met with a cell not hitherto described in renal exudates, namely, the eosinophilic leucocyte. This cell was very numerous in the interstitial exudation in two cases (I. and III.), and in one case (I.) in many places it was the most numerous cell present. In two cases the presence of this cell in the exudation appeared to be due solely to emigration from the bloodvessels, while in one case (III.), in addition to this, it was evidently also due to transition from plasma cells in the interstitial tissue.

I have also been able to confirm Councilman's observation of the presence of plasma cells in the bloodvessels and the mitosis of these cells. There can be no doubt that they possess amœboid activity to a high degree.

In addition to these cases of typical acute interstitial nephritis, the records contain three other cases of interest in this connection. The first case was one of chronic interstitial nephritis with marked connective tissue increase. Beside the small round cells (lymphocytes?) plasma cells and mononuclear and polymorphonuclear eosinophilic cells were found in considerable numbers in the areas of cellular infiltration.

The second case was one of hemorrhagic cystitis, prostatic abscess, pyelonephritis, chronic arterio-sclerotic nephritis, and gaseous emphysema of the kidneys and liver. Cultures from the kidneys showed the streptococcus, B. coli, and B. aërogenes capsulatus. Sections of the kidneys hardened in Zenker's fluid, cut in paraffin, and stained with eosin and methylene-blue showed, beside well-marked arterio-sclerotic nephritis, multiple abscesses and larger and smaller areas of cellular infiltration without tissue necrosis. In the abscesses there was always a central area of necrosis surrounded by polymorphonuclear leucocytes, plasma cells, and eosinophiles, the polymorphonuclear neutrophile being the most numerous cell. Many cells were found in the neighboring tubules as well as in the interstitial tissue. In these areas there were cocci, short, thin bacilli, and large numbers of long and short, stout bacilli, corresponding respectively to the streptococcus, B. coli, and B. aërogenes capsulatus obtained in cultures. Beside these areas of abscess

formation, scattered throughout the sections, but most numerous in the deep cortical and medullary portions, there were larger and smaller areas of diffuse interstitial nephritis, with plasma cells, polymorpho-nuclear, neutrophilic and eosinophilic leucocytes. Similar cells were seen in the dilated vessels. These areas were free from tissue necrosis.

In the third case there were acute and chronic interstitial nephritis, with small abscesses and epithelioma of the bladder. Cultures from the genito-urinary as well as the other organs were sterile. Urotropin had been taken for some days before death. In addition to the marked chronic interstitial nephritis and small abscesses (where the polymorpho-nuclear neutrophilic leucocyte was the most common cell), there were a number of areas of cellular infiltration of the interstitial tissue without changes in the epithelium. The cells in these areas were plasma cells, lymphocytes, and eosinophiles. In the adventitia of one of the small arteries there were numbers of plasma cells and eosinophiles.

In the first of the three last-mentioned cases the areas of cellular infiltration probably represented simply an acute exacerbation or spreading of the chronic process. The last two cases, however, very closely resemble the very similar ones reported by Councilman on page 416 of his monograph.

ETIOLOGY OF ACUTE INTERSTITIAL NEPHRITIS. Consideration has already been given to the bacteriological examination of the kidneys in acute interstitial nephritis. As a result of his work Councilman concludes that bacteria play no part in the etiology of this affection, for in many cases cultures are sterile, and in the cases where organisms are found they are of various kinds, and no bacteria can be demonstrated in the hardened sections. In our three cases there was general streptococcus infection after abortion in one case; in one case there was otitis media and bronchopneumonia, due to streptococci, and in the other case no bacteria grew except a very few staphylococci from a small stitch abscess. Both Councilman and I have, however, found acute interstitial nephritis in kidneys the seat of suppurative processes, in which staphylococci, streptococci, B. coli, and B. aërogenes capsulatus were found. Councilman concluded that no adequate explanation has been offered for the focal lesions in the kidneys, but thinks that physical conditions of the circulation may be concerned in the accumulation of cells in certain places, and that the interstitial foci may be due to the presence of soluble substances exerting a positive chemotaxis for the cells.

It seems to me that the latter is the correct explanation. This process occurs especially in diseases due to or which are commonly subject to mixed infection with micro-organisms which produce powerful toxins—notably B. diphtheriæ and streptococci. It seems probable, judging from the comparatively slight changes in the renal epithelium, that the

toxins in the kidneys in these cases are much diluted, and instead of producing wide-spread tissue necrosis with abscess formation, they attract to themselves and cause to multiply in the interstitial tissues and in the neighboring bloodvessels cells of the same character whose proliferation they stimulate in the hæmotopœtic organs; for, as Councilman and Pierce have shown in scarlet fever and diphtheria, great numbers of plasma cells are formed in the bone-marrow, spleen, and lymph-glands. I have observed the same thing in diphtheria.

In a large number of inflammatory and other processes, notably in infections caused by the streptococcus, the gonococcus, and the tubercle bacillus I have observed a large increase of plasma cells and eosinophiles in the lymph-glands and even the spleen. I have traced the development of plasma cells into eosinophiles with typical granulations in a variety of tissues and conditions, and have elsewhere called attention to this fact.[1] These observations will be reported in detail in another article.

CONCLUSIONS. I have been able to confirm Councilman's observation of the occurrence (1) of plasma cells, lymphocytes, polymorphonuclear leucocytes in acute interstitial nephritis. (2) The presence of lymphocytes and plasma cells in the dilated vessels. (3) Mitosis and evident amœboid activity of plasma cells in both bloodvessels and tissues.

In addition to the cells described by previous authors I find large numbers of typical eosinophilic leucocytes in the interstitial exudation and in the bloodvessels in acute interstitial nephritis. In some places in one case these were the most numerous cells in the exudation.

The eosinophilic leucocytes in the lesions of acute interstitial nephritis are for the most part brought to the part by the bloodvessels and reach the interstitial tissue by emigration, but there is evidence (in one case) that they may be formed locally from plasma cells. The large phagocytic cells were not found in my cases.

My thanks are due to Dr. R. G. Perkins for the photomicrographs and to D. W. Whitcomb for the drawings.

RARE CARDIAC ANOMALIES.

CONGENITAL AORTICO-PULMONARY COMMUNICATION; COMMUNICATION BETWEEN THE AORTA AND THE LEFT VENTRICLE UNDER A SEMILUNAR VALVE.[2]

BY LUDVIG HEKTOEN, M.D.,
OF CHICAGO.

IN the following will be described two decidedly uncommon defects —one of the septum between the pulmonary artery and the aorta, and

the other of the base of the right anterior aortic valve, the latter being, as far as I can tell, absolutely unique. The patients, two new-born infants, died in the Presbyterian Hospital while under the care of Prof. Cotton, and the post-mortems were made in my laboratory. Both cases have been previously recorded by Prof. Cotton,[1] but with especial reference to certain clinical manifestations, particularly anuria, hence the reason for this additional report.

I. *Large defect in the septum between the pulmonary artery and the aorta, the heart normally developed; general infection with B. mucosus capsulatus. Post-mortem* (675).—Well-developed, fairly well-nourished male infant, 51 cm. long, weighing 2657 grammes. There are no external malformations. The surface of the body, both anteriorly and posteriorly, is bluish-red in color. The umbilical cord is dry and separating at the navel. The abdomen is somewhat distended.

The abdominal cavity is empty, the lining smooth. The diaphragm reaches to the fifth right and sixth left ribs.

The pleural cavities are empty and smooth as to lining, the visceral pleura being the seat of many hemorrhagic extravasations.

The pericardium is also smooth, the cavity contains a small amount of clear fluid.

The mouth, pharynx, larynx, trachea, and œsophagus are normal. The thyroid is of usual size; the thymus rather small.

The lungs are fully distended and show many small, deeply-congested spots throughout the parenchyma; no bronchitis.

The heart presents a much larger right than left ventricle; the latter is situated more behind the right than usual. The walls of the two ventricles are of about the same thickness, but the cavity of the right ventricle is much the larger. The tricuspid and mitral valves are quite normal; the pulmonary and aortic valves are also well formed and normal. There is an oval defect, about 1.5 cm. in its greatest diameter, between the pulmonary artery and the aorta, so that a little above their beginning the aorta and the pulmonary artery have a common trunk from which emerge in the usual places, relatively, the right and left pulmonary arteries and the branches of the arch of the aorta (Fig. 1). The greatest diameter of this common trunk is 3 cm. Between the semilunar valves arises a septum with a somewhat rounded, concave upper margin; from the base of the pulmonary semilunars the septum rises to a height of 3 mm., while from the base of the aortic semilunars the septum is 1 cm. high. The ductus arteriosus is fully patent and quite large, and the part of the aorta distal to the duct is wider than the transverse part proximal to the duct. The foramen ovale is widely open. The veins—pulmonary and caval—are quite normal. The ventricular septum is normal.

The stomach and intestines are normal.

The pancreas is normal.

The liver and spleen are congested, the liver being soft and mottled, yellow and red. The spleen weighs 10 grammes, the liver 110 grammes. The adrenals are normal, weighing 11 grammes.

The uro-genital organs are normally formed and situated. The

bladder contains a small amount of turbid urine, the mucous membrane immediately about the ureteral orifices is swollen and red. There is no dilatation of the ureters and pelvis. There is marked uric-acid infarction in both kidneys with some congestion of the pyramids. The kidneys weigh 26 grammes.

FIG. 1.
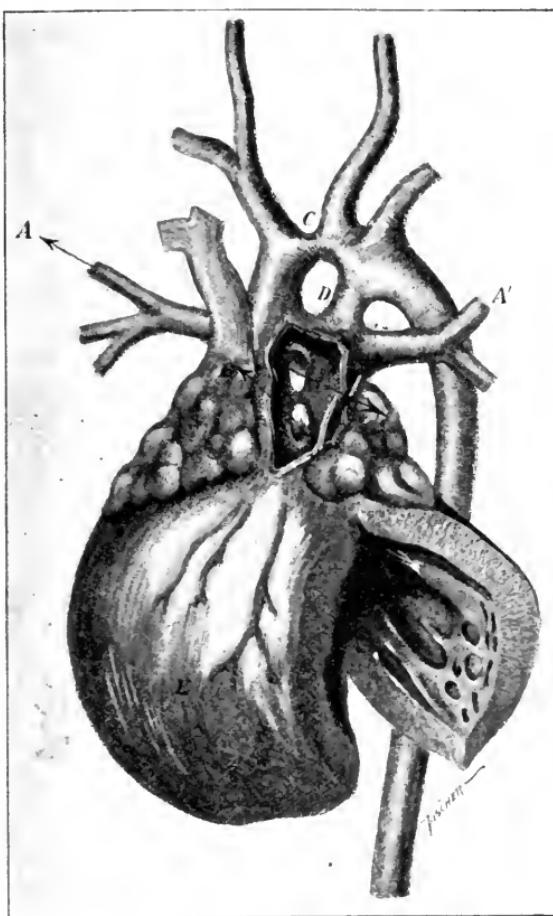
Aortico-pulmonary communication.

A, right pulmonary artery. A', left pulmonary artery. B, opening of aorta from left ventricle into common trunk. C, partial obliterated aortic arch. D, large patent ductus arteriosus. E, hypertrophied right ventricle.

The brain and its membranes are normal; weight, 1381 grammes. The lines of ossification are even and regular; Bichat's centre measures 4 mm.

Bacteriological Examination. Smears and cultures from the heart's blood, the lungs, the liver, the spleen, and the kidneys all show a bacillus with the morphological, cultural, and pathogenic characteristics of bacillus mucosus capsulatus.

Histological Examination. The heart shows normal structural conditions.

The lungs are the seat of an extensive hemorrhagic infarction, the alveoli and bronchioles in places being filled to distention; otherwise no changes.

The liver is the seat of a marked passive congestion with fatty infiltration of the liver cells and some recent increase in the periportal connective tissue, which is rather cellular.

The cortex of the kidney shows cloudy swelling of the epithelium of the convoluted tubules. In the medulla the uriniferous tubules are crowded full with a granular material which stains light blue with hæmatoxylin; the epithelial lining is intact and the vessels uniformly distended with blood.

Sections stained with methylene-blue show occasional encapsulated short bacilli here and there in all the organs, especially among extravasated corpuscles and in the capillaries of the lungs.

Instances of direct communication between the aorta and the pulmonary artery, caused by congenital defect in the septum of the arterial trunk, are described by Elliotson,[1] Wilks,[2] Fräntzel,[3] Baginsky,[4] Cæsar,[5] Girard,[6] and Richards;[7] Rauchfuss[8] and Gerhardt[9] also each mention an instance. These seem to be all the instances recorded in literature. The defect is rare. Virchow, in discussing Baginsky's case, remarked that he had not seen an example before. As far as I have been able to learn, there is no previous instance recorded in American literature.

In all these instances (except Richards' case) there is a simple communication between the aorta and the pulmonary artery, the opening being situated a short distance above the semilunar valves, round or triangular in outline, and 10 to 12 mm. in diameter. Other malformations are not noted, and evidences of endocarditis or angeitis are wanting altogether. This form of communication is consequently of congenital nature, and it is to be distinguished from the more frequent, similarly located communications of acquired, accidental origin.[10] It is also to be held distinct from communication between the pulmonary artery and the arch of the aorta through a persistent ductus arteriosus, which, when uncommonly short, may lead to a close approximation of the two vessels. The location of this communication would be different, namely, at the arch of the aorta.

[1] Lancet, 1830.

[2] Transactions London Pathological Society, 1859, vol. ii. p. 59.

[3] Virch. Arch., 1868, vol. xliii. p. 420

[4] Berl. klin. Wochenschr., 1879, p. 439.

[5] Lancet, 1880, vol. ii. p. 768.

[6] Ueber einen Fall von congenitaler Communication zwichen Aorta u. Arteria pulmonalis. Zurich, Dissertation, 1895.

[7] British Medical Journal, 1881, vol. ii. p. 71.

[8] Gerhardt's Handbuch der Kinderkrankheiten, 1878, iv., Abth. i., p. 61, note.

[9] Lehrbuch der Kinderkrankheiten, 1874, vol. i. p. 244.

[10] See L. Brocq, Étude sur les communications entre l'aorta et l'artère pulmonaire autre que celles qui résultant de la persistance du canal artérial. Revue de Médecine, 1885, vol. v. pp. 1016-1056; 1886, vol. vi. pp. 786-816.

TABLE OF CASES.

No.	Author.	Age.	Sex	Clinical symptoms.	Description of defect.	Ductus arteriosus.	Remarks.
1	Elliotson	Young	F.	....	Opening admitted end of finger.	Closed	No other anomalies.
2	Wilks	8 mo.	...	Strong systolic bruit at base; no cyanosis; ascites.	Opening admitted goose-quill.	Closed	Pulmonary artery large, aorta small; no trace of inflammation; no other anomalies.
3	Fräntzel	25	F.	Dyspnœa and palpitation as long as she had memory. Increased cardiac dulness; dropsy; cyanosis; changing auscultatory phenomena; at first systolic and diastolic murmur; later diastolic murmur was replaced by double tone; diastolic murmur same distribution as in aortic insufficiency.	1 cm. above margin of aortic valves a round opening 12 mm. in diameter.	Closed	Dilatation and hypertrophy of heart; right pulmonary artery originated from aorta just below arch; coronaries normal; no endocarditis; thrombi in left ventricle; innominate, common carotid, vertebral and left subclavian given off by arch; anasarca. (Post-mortem by Cohnheim.)
4	Baginsky	4 yrs.	F.?	Under observation since 8 days after birth; there was cough, dyspnœa, hoarseness, cardiac irregularity, systolic and diastolic murmurs, and repeated disturbances of compensation; scarlet fever and nephritis. Death from whooping-cough.	Opening between aorta and pulmonary artery 1 cm. in longest diameter; margins somewhat thickened; almost triangular in outline; base on level with upper border of left pulmonary semilunar valve and 5 cm. above free margin of aortic valves.	Closed	Parenchymatous nephritis; hypertrophy of both ventricles, more of the right, the left being the one most dilated.
5	Gerhardt	5 mo.	F.	No details except rough sound over heart.	Rounded opening with sharp margins.	....	No endocarditis; specimen in Museum of Guy's Hospital.
6	Ranchfuss	Nursling	...	No details.	No details.	Closed	
7	Cæsar	9 yrs.	M.	Cyanosis since three months. Passed through measles, bronchitis, pneumonia; otitis 1–3 year; right hemiplegia since 5; died at 9 in convulsions; no murmurs.	Communication between aorta and pulmonary artery size of a sixpenny.	Not stated	Marked fenestration of aortic valves; ascending aorta as large as that of an adult; pulmonary and meningeal tuberculosis; large chronic abscess with calcareous mass in left hemisphere.
8	Girard	37	M.	Smallpox at 1; dyspnœa and cardiac distress since then; otitis; severe fever at 20, with swelling of legs; also other illnesses. Four years before death: dyspnœa and hæmaturia; systolic murmur with accentuation of 2d sound. Clinical diagnosis; mitral insufficiency, renal embolism, hæmaturia. Shortly before death: dyspnœa, cyanosis, gallop rhythm, enlargement of heart.	11 mm. above free edge of aortic valve opening into pulmonary artery 10 mm. in diameter; no change in intima of aorta and pulmonary arteries.	Not stated, probably closed	Heart weighed 670 grammes; hypertrophy of heart especially marked of right side thrombus in apex of right ventricle; endocardium normal; coronary orifices large; extensive congenital tuberculosis.

No.	Author.	Age.	Sex	Clinical symptoms.	Description of defect.	Ductus arteri-osus.	Remarks.
9	Richards	30	M.	Brassfounder until three months before death. Two loud, systolic and diasto-lic murmurs; hyper-trophy of heart; dyspnœa; anasarca.	Behind larger of bicuspid aortic valves circular opening into pul-monary artery ad-mitting little fin-ger; margins membranous, smooth; passage somewhat funnel-shaped.	Not stated	Hypertrophy and di-latation of heart; no endocarditis; pulmonary artery dilated above open-ing from aorta; de-fective interventric-ular septum.
10	Cotton-Hektoen	3 days.	M.	"Blue baby." Anuria.	Oval defect 1.5 c.m. in its greatest diameter in sep-tum above semi-lunar valves.	Patent, rather large	Foramen ovale open; no other defects; right ventricle hypertrophied.

Closely related to direct congenital communication between the pul-monary artery and the aorta is congenital communication between the beginning of the aorta and the right ventricle. Such cases are described by Cayla,[1] Charteris,[2] and Livingston.[3] In Cayla's case (man, aged thirty four) a canal passed from the upper part of the ventricle into the aorta just above the valves, which was somewhat irregular. Quenu suggests that the defect was caused by failure of union between the septum of the bulb and the interventricular septum. Charteris describes an opening " immediately under " the right valvular aortic curtain communicating with the right ventricle. This occurred in a man, aged fifty-three years, and perhaps a question might be raised as to its congenital nature.

Livingston's case occurred in a child four months old. Just at the beginning of the aorta a communication led into the right ventricle. There were only two aortic valves. White[4] and Tate[5] also describe somewhat similar defects. Lediberder's[6] case was more complicated. Here there was pulmonary stenosis, closed foramen ovale, open ductus arteriosus, and communication between pulmonary artery and aorta. I have not looked up the details.

In White's case (boy, aged fifteen years) the whole upper septum was deficient in thickness, and there was failure of complete closure at the right of the " undefended space." A small aneurism had formed behind the right aortic valve and ruptured into the right ventricle.

Tate describes a trumpet-shaped membranous tube extending from a rounded opening at the lower part of the anterior aortic valve into

[1] Progrès méd., 1885, 2 ser., vol. ii. p. 121.

[2] Med. Press and Circular, 1883, vol. xxxv. p. 354.

[3] Med. Record, 1883, vol. xxiv. p. 249.

[4] Transactions London Pathological Society, 1892, vol. xliii. p. 34.   [5] Ibid., p. 36.

[6] Bull. de la Soc. Anatomie, 1836, p. 68. Quoted by Taruffi, Sulle malattie congenite e sulle anomalie del cuore. Bologna, 1875, note, p. 102 ; and by Vierordt, Nothnagel's specielle Path-ologie u. Therapie, 1898, vol. xv. I. Theil, II. Abth., p. 79.

the right ventricle. At the same time there was a saccular projection in the right ventricle at the '' undefended space.''

Congenital communication between the pulmonary artery and the aorta are to be traced back to developmental anomalies of the septum that divides the primary arterial bulb into two large vessels. A defect of this sort dates from some period of intra-uterine life before the seventh or eighth week, because at this time the pulmonary artery and the aorta are completely separated (Born,[1] His[2]). Based upon the presence of fenestrations of the aortic valves in the case of aortic and pulmonary opening described by Cæsar, H. Vierordt[3] suggests that the septal defect may be the result of an extension to the arterial wall of the process of hollowing out, whereby the primary endothelial cushions are converted into thin leaflets. At all events, the uncomplicated nature of the defect in most of the cases, including the one now reported, indicates that the defect is the result of abnormal developmental processes rather than of inflammatory changes (endangeitis). Similarly, communication between the aorta and the right ventricle may be ascribed to faulty development of the aortic septum; complete union between the interventricular septum and the aortic septum may fail to take place during the time that the conus arteriosus takes up part of the auriculo-ventricular orifice (about the seventh week—Born).

The clinical features of direct congenital communication between the pulmonary artery and the aorta are considered by L. Brocq,[4] H. Vierordt,[5] and Leon Cazin.[6] The latter author made the clinical diagnosis of this lesion in a young woman, but in the absence of post-mortem examination its correctness will always be open to doubt. L. Brocq[7] shows that the location and the mechanical consequences of congenital aortico-pulmonary communications are the same as in accidental communications; but in the first the lesions are more pure, hence the true symptomatology should be sought in the congenital form; but the number of instances of the latter is as yet rather small for drawing a definite clinical picture. In most of the recorded cases the lesion was a surprise revealed by the autopsy.

The cases are equally distributed between the sexes. The age attained varies from a few hours to thirty-seven years.

In all the cases that died at an age of from four to thirty-seven years

[1] Beiträge zur Entwickelungsgeschichte des Säugethierherzens, Arch. f. mikr. Anat., 1889, vol. xxxiii. pp. 284–378.

[2] Anatomie menschlicher Embryonen, Leipzig, 1880, vol. iii. p. 140. Beiträge zur Anatomie des mensch. Herzens, Leipzig, 1886. See also Minot, Human Embryology, 1897, pp. 521–534.

[3] Nothnagel's specielle Therapie u. Pathologie, vol. xv I. Theil, II. Abtheil., Die angeborenen Herzkrankheiten, 1898, pp. 138–141.

[4] Loc cit.   [5] Loc. cit.

[6] Communication cong. entre l'aorta et l'artère pulmonaire sans persistance du canal artérial. Thèse de Paris, 1897.

[7] Loc. cit.

definite symptoms of heart disease were present; in three of them the heart lesion seems to have been the cause of death (Fräntzel, Baginsky, Richards); in two the cardiac disease was complicated by meningeal and urogenital tuberculosis (Cæsar, Girard). In the case now reported there was a general and marked infection with B. mucosus capsulatus.

By reference to the table of cases it is seen that the statements with respect to cardiac murmurs vary much. The most common murmur is a double one—systolic and diastolic—at the base; in Girard's case there was also persistence and accentuation of the second sound. In several cases the changing, uncertain character of the murmur is noted.

Occasionally hypertrophy of the heart, especially at the right ventricle, quite commonly noted at the autopsies, was demonstrated by the physical examination. In all cases where the condition of the ventricle was noted there was found more or less hypertrophy, sometimes only of the right ventricle, but occasionally of both, the right being the larger; the reason for this being that the right ventricle contracts against the current sent out by the left side of the heart, which is the naturally stronger side.

Dyspnœa, cyanosis, ascites, and anasarca were present in Fräntzel's case, and in Baginsky's, Girard's, Richards', and Wilks' cases some one of these evidences of grave disturbance of the compensation are noted, cyanosis being definitely mentioned by Cæsar and Girard, as well as Fräntzel; but the statements in regard to cyanosis are hardly definite enough to determine whether it was due to the defect itself or to the resulting cardiac insufficiency. In the infant that I examined cyanosis was fairly well marked. In this case there was also complete anuria.[1]

II. *Regurgitation through smooth depression under base of anterior aortic valve, which is attached to and carried across by a tendinous bridge; hypertrophy of the heart; dilated arterial duct; congestion. Postmortem* (838).—A well-developed, well-nourished female, new-born child; the body still warm; the umbilical cord is dry and there is a line of separation around its insertion at the navel; rigor is strong; the surface of the body is livid.

The serous cavities of the trunk are empty; their linings smooth. The diaphragm reaches to the fifth ribs.

The pharynx, larynx, and trachea are normal. The thymus and thyroid are normal. The lungs are distended and contain many areas of hemorrhage, subpleural and deep-seated. The lungs crepitate freely; no bronchitis; much congestion.

There are subepicardial extravasations at the base of the heart. The heart is distended with blood. There is great enlargement of the heart, especially the left ventricle. From base to apex the heart is 4.5 cm. long and 5 cm. across the widest base. The heart weighs 42 grammes. The endocardium of the right side is normal. The depth is 4 cm.;

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[1] See Cotton.

the wall is 3 mm. thick. The tricuspid orifice is 1 cm. in diameter.
The foramen ovale is patent, and the ductus arteriosus is large and
widely open, the aortic orifice of the duct measuring 6 mm. across; it

FIG. 2.
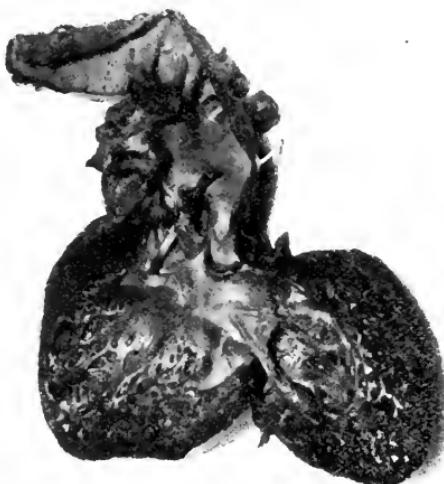
Bulging at aortico-septal junction and communication between aorta and left ventricle
under anterior aortic leaflet

FIG 3

Amplified sketch of malformation seen in Fig. 2.

is normally located. The pulmonary artery is normal. The mitral
orifice is small—about 0.5 cm. in diameter; the auricular surface of
the valve is smooth, but somewhat nodular, and there are also slight

thickenings upon the chordæ tendinæ; no ulceration; no thrombosis.
The aortic valves are large, higher than normal (about 6 mm.), of
irregular thickness, but smooth, there being small, delicate, reddish
nodules upon them, so that they appear somewhat deformed.[1]   There
are no distinct lunulæ or corpora arantii.   There are three valves, but
the anterior segment is attached to an irregular, dense, and firm, band-
like bridge, 2 mm. thick, which extends across an oval depression in
the upper part of the interventricular septum and the lower aspect of
the aorta, which here presents a marked bulging anteriorly between the
aorta and pulmonary artery (Figs. 2 and 3).   It looks as if the lower
end of the aorta and the interventricular septum had failed to develop
fully.   The junction of the septum and of the aorta occurs under the
bridge, the line of exact junction being rather indefinite.   The depres-
sion is 1.5 cm. vertically, 1 cm. across, and 8 mm. deep.   The bulging
is smooth, and there is no communication between it and the pulmonary
artery or the left ventricle.   The left half of the upper limit of the
depression is marked by a rather sharp ridge in the aorta, but the right
half is marked by a rounded bulging.   Viewed from the right ven-
tricle the " undefended space " appears as a triangular area near the
centre of the depression in the aorta.   The interventricular septum is
not perforated.   The left ventricle is 4 cm. deep, and the wall is 5
mm. in average thickness.   The beginning of the aorta, just above the
sinuses of Valsalva, is wider than usual, but smooth; it is 2.5 cm. in
circumference.

The right coronary arises in the deep sinus behind the anterior semi-
lunar valve, near the right end of the bridge.   Its distribution is nor-
mal; some of the branches at its beginning are rather large.

The left coronary arises in the sinus of the left posterior semilunar
valve; the opening is a little higher than the right.   The upper margin
of the sinus is outlined by a rather sharp ridge.

The liver is large, congested, bluish in color, and it weighs 127
grammes; it is smooth.

The spleen is congested and weighs 7 grammes.

The kidneys show marked uric-acid infarction in the medullary pyra-
mids.   The ureters and bladder are normal.   The adrenals are normal.

The stomach and intestines are normal.

The brain could not be examined.

Bacteriological Examination.   Smears and cultures from the heart's
blood and from the large organs do not contain any bacteria.

Histological Examination.   The alveoli in some parts of the lungs
are filled with blood; also the bronchi; the lining epithelium normal.
Spleen, adrenals, kidneys, thyroid, and liver greatly congested; most
of the alveoli of the thyroid are empty; in some is a pinkish material
(hæmatoxylin and eosin stain).   Sections of the mitral valve show no
inflammatory changes.

Study of the anomalies of the semilunar valves quickly brings out
the unique and peculiar character of the anomaly in this case.   Indeed,
it is not an anomaly of the aortic valves as much as of the aortic sep-

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[1] At the autopsy the irregularities were thought to be due to endocarditis, and it was so stated
in the anatomical diagnosis.

tum. I have found no mention of any similar condition in the literature.[1]

The most common anomalies of the semilunar valves are the well-known fenestrations near the free margins, and deviations in number,[2] size, and form. Other congenital anomalies are very rare, indeed. Dilg[3] describes a rare and complicated anomaly : right conus stenosis, two pulmonary semilunars, and stenosis of the conus of the left ventricle produced by a peculiar circular endocardial fold partially subdivided into valves, the shallow, valvular sinuses opening toward the ventricle. Dilg regarded this tendinous ring as an imperfect, second row of valves, the condition resembling somewhat that observed in some of the bony fishes in which the conus arteriosus presents several transverse rows of valves.[4]

In Banks'[5] case of "perforation of the aortic valves—loud musical murmurs "—the aortic valves were " cribriform," and there were three little rudimentary valves one-quarter of an inch below the aortic orifice. Corrigan,[6] in a letter to Banks, attributes the musical murmur to the vibrations of the rudimentary valves.

Röhrle[7] describes a tendinous cord in the aorta of a child. This was the only case of the kind in 25,000 autopsies at the Foundlings' Home in Moscow. The tendinous band originated at the left end of the left semilunar valve, and was stretched quite tightly across part of the lumen of the aorta to the left end of the right semilunar valve. The two ends were thin-like threads ; the central part was 0.5 mm. in diameter.

Robert S. Archer[8] describes a similar band in a man, aged thirty-nine years. The band was stretched loosely across the lumen of the aorta just above the line of insertion of the aortic valves. It arose by an expansion, one-half inch wide, from the aorta just above the junction of the posterior and left lateral semilunar valves ; gradually narrowing, it became inserted at the junction of the posterior and right lateral cusps, thus dividing the area of the vessel into two unequal parts. It seemed to consist of the same kind of tissue as the valves. Otherwise the heart was normal. No clinical observations of the heart's

[1] Potain and Rendu (anomalies de l'orifice aortique, article cœur, Dictionnaire encyclopedique des sciences médicales, 1876, vol. xviii. p. 571) ; Marchand (Eulenberg's Realencyclopædie, 1897); Peacock (Malformations of Human Heart, 1866) ; Taruffi (Sulle malattie congenite e sulle anomalie del cuore, 1875), and H. Vierordt (Nothnagel's Path. u. Ther., 1898, vol. xv.) do not mention any anomaly resembling this.

[2] Peacock, loc. cit. Osler, Bicuspid condition of aortic valves, Transactions Association of American Physicians, 1886, vol. i. p. 185.

[3] Virch. Arch., 1883, vol. xci. p. 193.

[4] Gegenbauer. Lehrb. der Anat. des Menschens, Leipzig, 1883, p. 625.

[5] Dublin Hospital Gazette, 1857, vol. iv.   [6] Ibid., p. 49.

[7] Chorda tendinæ in aorta, Deut. med. Wochenschr., 1896, p. 270.

[8] Notes on a congenital band stretching across origin of aorta. Dublin Journ. of Med. Sci., 1878, vol. lxv. p. 405.

sounds were made.   Archer believes the development of this band in
some way was connected with the development of the valves.

- Kretz describes an analogous case in which two fibrous bands crossed
the aorta from before backward; one, arising from the right aortic
valve, was inserted into the concave side of the aortic arch, 3 cm.
above the valves; the other crossed the aorta higher up.   These bands
are regarded as remnants of the partition between the two embryonic
aortæ.

Bouillaud[1] also describes an aortic band or fold, but I have not been
able to secure the details.   Stintzing[2] describes a replacement of one
pulmonary segment by two parallel, wholly attached, smooth, narrow
bands or ledges extending, one wholly, the other but half-way, across
the valveless space.   Duckworth[3] showed a heart with four semilunar
valves.   "The adventitious valve .   .   .   communicated with one
of its fellows at its insertion by an aperture large enough to admit a
crow-quill."

There is nothing directly comparable with the anomaly in the present
case.

The marked leakage under the base of the anterior valve produced
hypertrophy of the heart, especially the left side; it also led to marked
dilatation of the arterial duct, and, further, to pulmonary and general
venous congestion.

The smoothness of the depression at the aortico-septal junction, the
normal condition of the coronary artery arising from its bottom, and
the well-formed aortic valves tend to the conclusion that the lesion is
the result of purely developmental disturbances rather than of intra-
uterine aortitis; but the exact genesis of the anomaly is probably not
explainable at this late day.   One may say, however, that "as with
every other anomaly, adequate knowledge will show it to be a natural
sequence."

The exact developmental history of the human semilunar valves has
not been worked out.   According to current teaching,[4] four small endo-
thelial cushions appear at the ventricular orifice of the bulbus aortæ
before its division in the aorta and pulmonary artery has taken place.
Two of these are merely the ends of the ridges by which the aorta is
divided (Minot).   On completion of the division the two ridges are
divided, thus making four protuberances, or in all six—three for each

[1] Bull. de l'Acad. de Méd., 1862-63, vol. xxviii. p. 777.

[2] Ueber eine seltene Anomalie de Pulmonalklappen.   Deut. Arch. f. klin. Med., 1889, vol.
xliv. p. 149.

[3] Trans. London Path. Soc., 1886, vol. xvii. p. 113.

[4] Born, Arch. f. mikr. Anat., 1889, vol. xxxiii. pp. 284-287.   His, Beiträge zur Entwickelungs-
geschichte des Saugethierherzens.   Tonge, Observations on the development of the semilunar
valves of the aorta and pulmonary artery of the heart of the chick.   Proc. of Royal Soc. of
London, 1868, vol. xvi. p. 345.   Minot, Human Embryology, 1892, p. 534.

artery. These cushions may be seen in the human embryo of seven weeks (Minot). From them develop, by a process of hollowing out, the semilunar valves.

As already apparent, there is no malformation of the valves proper in this case. The endothelial cushions appear to have developed normally. Possibly the hollowing-out process may have extended to the wall of the aorta, and thus produced the oval depression under the valve, in the same way as Vierordt suggests that communication may be produced between the aorta and the pulmonary artery (page 169). It is a little difficult to understand, if this explanation be accepted, how the hollowing-out process could have jumped, as it were, so completely from the valve and out upon the aorta.

We learn further from embryology that the two ridges that divide the primitive aorta extend into the ventricle and help to form the interventricular septum. The aortic septum grows down to the edge of the septum inferius of the ventricle, and thus turns the original interventricular opening into the orifice of the aorta. This is accomplished chiefly by the left or anterior ridge, the right or posterior passing out on the lateral wall of the ventricle, where it is lost. The left ridge, however, runs on to the edge of the septum inferius (Minot). The thinness and the bulging of the aortico-septal junction under the anterior valve may be regarded as indicating a defective development of this part of the aortic septum—the left or anterior ridge. Union with the septum inferius ultimately took place ; perhaps the septum inferius extended further up than usual ; but in the meantime the endothelial cushion forming the anterior valve had extended across the defect. The primary endothelial cushions normally grow out until they meet each other. If there were an opening into the right ventricle at the bottom of the present aortico-septal depression no one would hesitate a moment in interpreting the anomaly as the result of a defective aortic septum. No doubt the depression in this case has greatly enlarged, until somewhat resembling an aneurism, by the pressure of the direct and regurgitating blood-streams that passed under the valve. Looking at the case in this way, one may say that defective aortic septum may lead to communication between the aorta and the pulmonary artery, between the aorta and the right ventricle, and between the aorta and the left ventricle under a semilunar valve.

REPORT OF A CASE OF BLASTOMYCETIC DERMATITIS.[1]

By HENRY W. STELWAGON, M.D., PH.D.,
OF PHILADELPHIA.

THE case to which I desire to call the attention of the members of this Congress is one which bears close resemblance clinically to other reported cases of this disease, several of which will doubtless be referred to in the papers on this same subject to be presented by my colleagues, Dr. James Nevins Hyde and Dr. T. Casper Gilchrist. This case has interested me much, and when it first came under observation I had no hesitation in expressing the opinion that it was a well-marked example of verruciform tuberculosis of the skin, of somewhat extensive development. Photographs of the cases of blastomycetic dermatitis already reported by the gentlemen just named coming under my notice induced me to believe the case to be one of this rare disease. Histological and bacteriological examinations, and the behavior and progress of the disease, have confirmed this revised opinion.

It is not, however, my purpose at the present time to go into a discussion of the disease, but merely to present the data of this case, and thus add to the as yet scanty literature of the subject one more case to those already reported. The reporting of cases of a rare disease is the essential foundation upon which its status and our future knowledge of its characters must be built. Briefly summarized, the case may be described as follows:

The patient, a male, aged forty-nine years, of English birth, but living in the United States for the past thirty years, came under my care in the Hospital Dispensary of the Jefferson Medical College of Philadelphia, in April, 1899. His occupation up to five years previously had been that of a hostler, but since then he had been variously occupied in work of light character. His family history is most excellent. He has two sisters and two brothers living, all over the age of forty years, and all healthy. He has two sisters and two brothers dead : one sister died when six months old, of cause unknown to the patient ; the other sister died from an abdominal operation when aged sixteen years ; one brother died of scarlet fever and the other was killed in an accident. His father died at the age of forty-seven years, the exact cause of death not being known ; his mother is living, at the age of seventy-five years. Both on his mother's and father's side the family record as regards freedom from disease and moderate longevity is unexceptionable. He has no knowledge of a single case of tuberculosis in his family, near or remote. He has not, moreover, so far as he knows, ever been brought into contact with any consumptive person. His own general health has always been good. With the exception of the usual

children's diseases, and a pneumonia in 1872, from which he made a good recovery, he has had no illness. He has never had venereal disease of any kind, nor has he had any skin eruption until the present disease manifested itself. He is of dark complexion, eyes and hair black, and is of moderate build and in a fair condition of general health, considering that he is poor and to a great extent debarred from making an ample living. He has two children approaching maturity, both in good health; his wife has never had any miscarriages.

The cutaneous disease began on the back of the right hand, just over the bases of the metacarpal bones of the first and second fingers. At this point the skin had been, about six weeks before the present condition began, slightly abraded or scratched by the teeth of a cat. These abrasions amounted to nothing more than superficial scratches, and in the course of ten days or two weeks healed completely. A few weeks later, on or about this same region, the first evidence of the cutaneous disease presented itself. Another fact, which although probably not having any relationship or bearing upon the disease, should be mentioned, and that is, at this time the patient was the possessor of a dog with the " mange," and having here and there loss of hair, which he was in the habit of constantly fondling.

The disease began, as well as the patient can describe, as a small, flat pustule or boil; this was accidentally broken open by a knock. It subsequently healed, and had in a month or six weeks practically disappeared excepting a slight, flat elevation and thickening. Soon afterward it began to swell and to fill up again, and tended to spread out laterally, with a slight surrounding inflammatory border and infiltration. In addition to a central opening the lesion broke down at two or three other points peripherally, which discharged, occasionally spontaneously or upon pressure; subsequently blackish crusts formed over these openings, so that the surface of the disease, which now involved an area of about one and a half inches in diameter, was covered here and there with these small, blackish crusts; from beneath one or more at times would exude seropurulent or serous liquid. It again began to spread, and in the course of months involved almost the entire dorsum of this hand. A new feature soon presented itself: early in 1898 a sluggish, shallow abscess-formation began to present itself on the upper arm close to the shoulder, which at first broke at the central point; filled up again and broke, and later also broke down at two points toward its periphery; the liquid discharged was of a seropurulent character, as a rule, but occasionally the exudation would be purely serous. The disease on the hand also took on more rapid action, spreading by lateral extension, extending up to the wrist and verging close on to the fingers. New sluggish, cutaneous swellings also presented upon other parts of the arm and forearm, and in this manner the disease gradually progressed There had never been much pain.

The condition of the patient when he first came under my care was as follows: The disease involved the whole dorsal aspect of the hand and lower wrist, with slight extension on to the fingers, as shown in Photograph No. 1. The surface was elevated and distinctly papillomatous, and discharged, especially upon slight pressure, a seropurulent liquid from some points and from others a liquid of a clear, somewhat thick, gummy character. The elevation was considerable (one-fourth to one-half inch), and at the borders there was a rim of slight infiltration,

gradually falling off and merging into the surrounding healthy tissue. In a few places there was a thin, ill-formed, cicatricial surface. Upon pressure the serous and seropurulent, sometimes slightly sanious, liquid could be pressed out from between the papillary projections. At this time he had several of the old subcutaneous, abscess-like formations upon both forearm and arm; one had entirely disappeared, leaving a thin, somewhat striated scar; another had practically disappeared, leaving slight thickening, with purplish-brown pigmentation.

These formations, which were of a violaceous or purplish color, would begin, as a rule, about alike: some slight superficial lumpiness, followed by a variable central upheaval, which subsequently broke centrally, and later, as a rule, at one or more other points peripherally. In one or two of these formations the single central opening alone presented, the lesion filling up several times. On the other hand, in others of these

Photograph No. 1. Blastomycetic dermatitis. Taken April, 1899.

abscess-like lesions there were a number of openings scattered over its surface, especially well marked in the one on the middle of the forearm; it was distinctly cribriform, bearing resemblance to both a small, flat carbuncle and also to kerión, more especially to the latter. There was never any of the active inflammatory border and base usually seen in carbuncles, but, on the contrary, the inflammation was of a comparatively sluggish character, such as observed about suppurating lymphatic glands of the neck. Such formations when fully completed were usually of about one to two and a half inches in diameter, elevated from the edges toward the centre, with usually an insignificant infiltrated border, and of violaceous or purplish color. The contents consisted of sero-pus and serum, which would come out spontaneously or which could readily be pressed out. The small openings would subsequently crust over with brownish or blackish crusts, and the formation slowly

begin to fill again and again discharge. At times what appeared to be pure serum would ooze out from one or more of these openings. These sluggish, flat, abscess-like formations would last almost indefinitely, in fact displaying very little tendency to disappearance. Sometimes the formation would discharge actively at first, and then almost entirely disappear, subsequently resuming a semi-sluggish activity. There was, however, in most of these formations a tendency to gradual healing, but it was slow and irregular, with exacerbations of active re-formation.

During the past several months a number of such new formations appeared, especially about the forearm and wrist. Occasionally there would be a tendency to accumulation of the contained liquid at two or three places on the dorsal surface of the diseased hand, producing slight swellings, followed by discharge. As a rule, however, the hand had

Photograph No. 2. Blastomycetic dermatitis. Taken March, 1900.

presented continuously its verrucous or papillomatous character, the secretion not collecting in abscess formation, but oozing out from the interpapillomatous crevices almost continuously. This papillomatous tendency was not displayed to any marked extent with the boil-like formations on the forearm and arm, although it was occasionally observed in some parts of the earlier lesions.

The back of the hand, in the region of the beginning disease, showed some slight improvement, so that the patient at the end of eight to ten months after coming under observation had, upon the whole, improved, as shown in Photograph No. 2, taken in March, 1900, although the improvement was not marked. As this photograph shows at this time, the hand presented less active disease; but nevertheless it also shows that the disease had extended slightly up the wrist and also further on to the fingers. At this date (April 23, 1900) smears and inoculations were made from the liquid of the boil-like formation on the arm and from

that which exuded from between the papillomatous projections of the dorsal surface of the hand. The patient would not permit excision of the tissues at this period. The report of this examination will be referred to below. The patient now disappeared. The last of June he

Photograph No. 3. Blastomycetic dermatitis. Taken June, 1900.

Photograph No. 4. Blastomycetic dermatitis— kerion-like lesion on arm. Taken June, 1900.

again presented himself. There was distinct improvement of the hand (Photograph No. 3) and also of the older formations on the arm and forearm. Places on the back of the hand had healed over, and were covered with thin scar or imperfectly formed epidermic tissue. The papillomatous appearance was, however, still maintained in the unhealed portions, although probably not to such a pronounced degree as formerly. The sluggish lesions on the arms were still there, and had increased in number, one or two new lesions having presented. The kerion-like or carbuncular-looking lesion, with its cribriform surface, situated about the middle of the forearm, was still actively discharging if but slightly pressed upon. This formation is shown in Photograph No. 4, taken the last of June, 1900.

At this time a survey of the disease showed the condition to be as follows: There was a flat, walnut-sized discharging boil-like tumor on the under part of the upper arm, near the axilla; one somewhat smaller over the biceps muscle close to the upper end, which, however, was about healed; below this was a slight, striated scar, the site of the first formation already referred to; on the extensor surface of the arm near the elbow there were two of these formations, healed over, but still somewhat elevated; on the outer side of the forearm, just below the elbow, there was a formation of a similar character to the last named; on the flexor surface of the forearm there was another of these formations, about one and a half to two inches in diameter, with the cribriform discharging openings, sometimes crusted over, above described; on the dorsal surface of the forearm there was near the wrist a similar growth, and two small, insignificant formations on the flexor side of the wrist. On the dorsal surface of the hand there were several small, boil-like formations with orifices closed over with crusts. At this time more material was obtained for histological and bacteriological examinations. The patient also permitted a few small pieces to be excised. The liquid was taken from the arm lesion and from between the papillomatous projection of the dorsum of the hand. The examinations of the material obtained at the two different periods mentioned were made by Dr. Randle G. Rosenberger, of the Jefferson Medical College Laboratory. The findings are essentially the same, and, therefore, only the investigation made last is given.

Dr. Rosenberger reports as follows:

Specimens consist of (1) spreads, (2) fluid from the lesions, and (3) several small masses excised from the lesions.

1. The spreads were stained with gentian-violet by Gram's method, methylene-blue, and for tubercle bacilli. Those spreads stained with gentian-violet, methylene-blue, and by Gram's method, show histologically numerous polymorphonuclear and a few mononuclear leucocytes, and a few squamous epithelial cells, also a few shreds of fibrin. Bacteriologically the spreads show numerous micrococci arranged principally in pairs, some in short chains of ten or twelve elements (streptococci), and others in irregular bunches (staphylococci). The diplococci are for the most part extracellular, a few being intracellular. Together with these organisms there are spherical and slightly oval bodies, a few possessing small projections which correspond to buds. These bodies are undoubtedly yeast fungi. A few bacilli, 2μ to 3μ in length and 0.5μ in thickness, resembling slightly the tubercle bacillus, were also

seen.   Upon staining especially for tubercle bacilli, however, none were demonstrable.

2. The fluid, of which there were only a few drops, was light yellow in color, clear, and without sediment.   Examined in the fresh condition a few leucocytes, principally polymorphonuclear, were demonstrable.   Numerous micrococci and streptococci were also to be seen. Inoculations made from this fluid on agar show a culture consisting of small, opaque, whitish colonies, remaining discrete.   Spreads made from these colonies and stained by ordinary methods show a pure culture of staphylococcus pyogenes albus.

3. Three small masses or shreds of tissue were received in 40 per cent. alcohol and one mass received in fresh condition.   Those from the alcohol were thoroughly dehydrated and embedded in paraffin.   Sections were cut and stained with hæmatoxylin and eosin, gentian violet, and by Gram's method, and also for tubercle bacilli.   Sections stained with hæmatoxylin and eosin show the mass to consist of stratified, squamous epithelial cells, with a large quantity of granular débris.   Sections stained with a gentian-violet and by Gram's method show numerous micrococci and a number of the spherical cells similar to those found in the spreads, a few with buds and one showing distinctly a double-contoured outline.   They are arranged for the most part in groups and are situated deep down in the tissues.   In sections stained for tubercle bacilli none were demonstrable, but with the counterstain used the spherical cells were again to be seen.

The small mass of fresh tissue was placed in a glycerin-agar tube, and up to forty-eight hours no growth was demonstrable.   It was then removed, macerated in sterile bouillon, and again inoculated on glycerin-agar ; spreads were then made from the macerated tissue and stained with gentian-violet.   These spreads showed numerous polymorphous leucocytes, few squamous epithelial cells, and numerous spherical cells, some with distinct buds and one or two with double-contoured outline.   They stain homogeneously throughout.

In the judgment of Dr. Rosenberger, and in accordance with my own belief, the fungous cells found are substantially similar to those found in this disease by other observers, although they are for the most part somewhat smaller.   An interesting point which I wish to emphasize is, that, although careful examinations were made in both investigations for the tubercle bacillus, the results were uniformly negative.   The clinical resemblance to tuberculosis verrucosa cutis is, indeed, striking ; but upon careful consideration and observation it seems to me that the course and characters of the blastomycetic disease differ, to some extent, from those of tuberculosis ; the repeated kerion-like or subcutaneous abscess formation with, in some such lesions, the cribriform surface, and the character of the contents and of the discharges from the papillomatous interstices are somewhat unlike those of tuberculosis of the skin. Still, it must be admitted that a positive and unquestioned diagnosis in these cases between blastomycetic dermatitis and certain forms of cutaneous tuberculosis can scarcely be made without histological and bacteriological investigations.

There is also a resemblance to the papillomatous tubercular syphiloderm, but to a less degree than to cutaneous tuberculosis.   The fact that in a few of the reported cases marked improvement from iodide administration ensued has suggested the suspicion that these cases represent an aberrant type of cutaneous syphilis.   While it is true that improvement and cure of an unusual and persistent cutaneous manifestation by the iodides must be given weight, and ordinarily point to a diagnosis of syphilis, there are exceptions to this.   For example, it is now known that in some cases of undoubted actinomycosis, a disease in many respects similar to blastomycetic dermatitis, the administration of the iodides has been followed by cure.   In syphilis the discharge from the interpapillomatous spaces and from the gummatous lesions is usually markedly purulent, and rarely, if ever, purely serous or mucoserous, as in blastomycetic dermatitis.   In this latter disease, and strikingly so in my case, the serous and mucoserous characters of these fluids was noticeable throughout; and these discharges were never purely purulent, only showing here and there or now and then a slight admixture of pus.   Moreover, the general clinical characters were scarcely suggestive of syphilis.

In the treatment of this case not much is to be said.   The man has been irregular in his attendance at the hospital, and has not had the continuous care desirable in such cases.   Nevertheless, there has, on the whole, been improvement, though very slight, under simple, mild antiseptic applications and tonic remedies internally.   Small doses of potassium iodide were given in the beginning of the management of the case, but as no improvement was then noted, and the digestion being thereby disturbed, this remedy was discontinued.   At each time that the patient visited the hospital, which he did for short periods daily and at other times at intervals of a week or so, the abscess-like formations were opened and the contents pressed out, and all the affected parts were cleansed and sprayed with dilute hydrogen peroxide; an ointment of boric acid and ichthyol was then applied. During the absence from the dispensary the patient continued to apply this ointment, spread as a plaster, renewing daily, and before re-application cleansing the parts with boric-acid solution.[1]

[1] This paper is based upon observations of the case ending in June. The patient came again under continuous observation and treatment in September, two months later. The same conditions prevailed, although there had been some slight change for the better. The iodide was again administered, but instead of potassium iodide as formerly, the sodium iodide was prescribed, and the dose gradually increased to thirty grains three times daily, along with the same applications locally as before. Since then slow and steady improvement has ensued, sufficiently pronounced after two months' observation and treatment to point with considerable probability toward eventual control of the disease.

REFRACTORY SYPHILIS, WITH REPORT OF A CASE UTTERLY RESISTANT TO SPECIFIC TREATMENT.

By Jay F. Schamberg, A.B., M.D.,

PROFESSOR OF DISEASES OF THE SKIN AT THE PHILADELPHIA POLYCLINIC AND COLLEGE FOR GRADUATES IN MEDICINE.

There are few diseases in which the physician has at his command such a sure and powerful remedy as mercury in syphilis. The introduction of the iodides in the treatment of this affection by Wallace, of Dublin, completed the therapeutic armament necessary to combat successfully this wide-spread and formidable disease. The treatment of syphilis with these two drugs has, within the past fifty years, been so uniformly successful that the dreaded scourge of the last century has come to be regarded as one of the diseases yielding the most gratifying therapeutic results. So far has this confidence extended that the failure of lesions to respond to the influence of mercury and the iodides suffices to cast a doubt upon their syphilitic nature. The therapeutic test has come to be universally regarded as a valuable diagnostic aid.

In the vast majority of cases mercury and its adjunct, iodine, accomplish all that could possibly be desired. In exceptional instances, however, they fail, and the knowledge of this fact is of importance, for it places certain limitations upon the value of the therapeutic test. This has prompted me to report the following case :

Mrs. X., aged thirty-nine years, was married seventeen years ago. Has four children, aged respectively sixteen, fifteen, twelve, and eleven years, all of whom are well. Had two miscarriages ten and thirteen years ago. Her family history is good, both parents being alive and well at the age of seventy years.

In 1892, eight years ago, the husband manifested evidences of syphilis, and soon thereafter his wife, the present patient, contracted the disease. The history given by the patient of the symptoms during this period is rather vague. In 1896 she suffered from ulcerative lesions upon the arms, legs, cheeks, and nose, and " sores " in the mouth. A patch upon the foot at this time persisted an entire year despite vigorous treatment. Since 1892 the patient has never been free from outbreaks of one character or another. The manifestations of the disease have not only been extremely obstinate, but their disappearance has been invariably followed by a renewed outbreak in the same region or elsewhere.

Present Condition. The patient is a stout, apparently robust woman. Her present weight is 180 pounds. Upon the right cheek is an annular scar, the remains of a former lesion. Upon the back of the neck, arms, hands, and thighs are visible a number of irregular whitish areas exhibiting loss of pigment. This leucoderma began, according to the patient's statement, about one and one-half years ago.

Upon the extensor surface of the left elbow is a circinate, dollar-sized patch (Fig. 1) made up of pea-sized moderately infiltrated tubercles. The

palmar surface of the right hand shows a papulo-squamous eruption extending in the form of the segment of a circle 6 mm. broad, from the base of the ring finger to the web of the index digit (Fig. 2). Here the eruption winds around the lateral surface of the fingers, ending upon the middle finger, the dorsum of which exhibits numerous flat and angry-looking tubercles. A few tuberculo-ulcerative lesions are present upon the palmar surface of the middle finger. There is suppuration beneath the nail of this finger which is the seat of a painful paronychia. While the patient is robust in appearance, her health is by no means good.

Fig. 1.

She suffers from time to time from nausea, diarrhœa, and cramps. She is frequently subject to headache, and complains constantly of weakness. Despite this, however, she has gained about twenty pounds in the past two years. The condition of the kidneys is normal. Since the beginning of her trouble the patient has been under more or less constant treatment. During the early years of the disease she was under the care of a physician who subjected her to a number of courses of hypodermatic mercurial injections. It appears that these did not suffice to keep the disease in check, for she had repeated syphilitic outbreaks. During the past year the patient has been treated at the Philadelphia

Polyclinic. During this period she has received sixteen injections of bichloride of mercury, as high as one-half grain to the dose, and has used one hundred and ten inunctions, each containing one drachm of the unguentum hydrargyrum. The iodides were not neglected, the patient having taken as much as sixty drops of a saturated solution of potassium iodide three times a day. In addition to this she has from time to time been placed upon the protiodide of mercury by mouth, combinations of potassium iodide, and the biniodide of mercury, Zittmann's decoction, tonics, and reconstructives. This treatment has failed to exert any pronounced influence either upon the disease or upon the existing syphilitic lesions. The papulo-squamous syphilide upon the hand and finger and the annular patch upon the elbow have on several occasions almost disappeared under the use of the inunctions

Fig. 2.

and injections of mercury, but just as we were about to credit the treatment with the favorable influence exerted the eruption would relapse. Owing to the immersion of the hand in water the eruption would at times take on an éczematous appearance. Local treatment has been used almost constantly, an ointment of calomel and carbolic acid having been found to give the best results.

There are many lesions of syphilis which for a time refuse to yield to anti-syphilitic treatment. This statement is particularly true of late palmar and lingual manifestations. These, however, will usually disappear under a sufficiently vigorous treatment. While such lesions might be termed obstinate, they would not belong to the class designated by Fournier as " refractory syphilis." In his incomparable work

on the treatment of syphilis, Fournier[1] says: "There are cases of syphilis against which all treatment is unavailing. In the absence of a better term (for the one which I employ satisfies me but incompletely) I would call such cases 'refractory syphilis.' There are cases of grave syphilis with particular malignity, which show themselves by grave manifestations and incessant recurrences, despite all that one can do. But the worst thing about these cases is that an outbreak is no sooner cured than a new one appears upon the scene, and this despite a most correct treatment. After this has been cured with difficulty there occurs a third, and so on during long years." Such a case is the following:

This woman contracted syphilis thirteen years ago, and has always been thoroughly treated. Several times we have administered to her such an energetic treatment as to determine a considerable mercurial irritation of the mouth. Despite all our efforts, she has not ceased for thirteen years to be the prey of multiple attacks of severe tertiary accidents. Quite recently she returned to our wards for the ninth time with a frightful syphilide of the face. Analogous cases would be quite easy to cite.

In July, 1899, Fournier exhibited before the Société Française de la Dermatologie et de Syphiligraphie two cases of syphilis refractory to specific treatment. His report in brief is as follows:

CASE I.—The patient is a woman who has had syphilis for two and one-half years. During this time she has not ceased to have multiple attacks of a malignant syphilis. At first profuse syphilides upon the skin and mucous membranes, headache, adenopathy, febrile attacks, loss of weight, anæmia. Then, after a few months, invasion of secondo-tertiaries, afterward frankly tertiary, tubercular and ulcerative lesions affecting the face and scalp, only disappearing under treatment to quickly reappear. Then deterioration of health, nervous phenomena, febrile attacks, and imminent cachexia. The patient has taken protiodide pills, Dupuytren pills, the syrup of Gibert, inunctions, potassium iodide (four to eight grammes a day), hundreds of injections of sublimate, benzoate of mercury, gray oil, and calomel to the number of forty. In addition, iron, quinine, glycero-phosphates, injections of serum, cold douches, etc.

The malignity of this case was attributed by Fournier to hereditary taint, the mother having been tuberculous, and the father, who was habituated to absinthe, had died of cerebral disease.

CASE II.—The patient was for five years subject to attacks of malignant syphilis, particularly tuberculo-ulcerative with phagadenic tendency. This patient received one hundred and eighty injections of benzoate of mercury and one hundred and twenty injections of calomel without arresting but for short periods the syphilitic outbreaks.

In the patient whose history I narrate above no hereditary taint can be invoked, as both parents of the patient are living and well at the ripe old age of threescore years and ten. The patient is not in good health, but is by no means cachectic. Her 180 pounds of weight and her ruddy color disprove such a supposition. I am at a complete loss to explain the utter refractoriness of the disease to treatment.

PHYSIOLOGICAL DILATATION AND THE MITRAL SPHINCTER AS FACTORS IN FUNCTIONAL AND ORGANIC DISTURBANCES OF THE HEART.[1]

BY MORTON PRINCE, M.D.,
OF BOSTON.

In 1889 the reader[2] reported a series of observations of the hearts of men examined under nervous excitement. The conclusions arrived at were that under such conditions the mitral sphincter may be dilated by internal pressure, and the valve thereby may cease to be efficient, and regurgitation may occur into the auricle. It was further contended that as a pure physiological disarrangement the mitral valve may become functionally inefficient from causes that weaken the sphincter-like action of the circular fibres of the heart, and that this was the true explanation of many functional murmurs, so-called, as well as what is known as " relative mitral incompetency."

I now return to the subject. The muscular fibres of the walls of the heart are arranged in three layers. The external and internal layers run longitudinally, while those of the middle layer run around the heart as circular fibres, and are the principal propulsive power of the heart. A special layer of these circular fibres surround the left auriculo-ventricular opening as a sort of sphincter (Henle, Landois). For the sake of descriptive convenience these may be called the mitral sphincter, although they are only a part of the great cone of circular fibres which squeezes the blood out of the ventricle. A knowledge of this anatomical arrangement is important.

It should be understood that what is said here regarding the physiology of the mitral valve is true of the tricuspid, but for the sake of convenience I confine myself to the mitral.

The mitral sphincter as a factor in the normal mechanism of closing the mitral valve is recognized by physiologists (among others, Tigerstedt, Curtis, Chauveau and Faivre, and Hesse), but not by all clini-

[1] Read by title before the Association of American Physicians, at Washington, D. C., at the fifteenth annual session, M ry, 1900.

[2] Medical Record, April, 1889.

cians. A fairly thorough search of the standard American and English text-books on general medicine and diseases of the heart discloses the fact that with a few noteworthy exceptions[1] medical writers do not seem to recognize this mechanism of the mitral valve or, if they do, the important rôle played by it, and the diversity of conditions in which it may be a factor.

Whether the sphincter action is supplementary only to the closure of the valves, or whether it is necessary for complete sealing of the opening under ordinary conditions is not clear; but that under extraordinary conditions a failure of this sphincter-like mechanism results in mitral and tricuspid incompetence is susceptible of experimental proof.

We have the following series of facts:

1. *Anatomico-physiological Facts.* The mitral orifice differs anatomically from the aortic orifice in not being like the latter, circumscribed by a rigid ring of fibrous tissue, and, therefore, of fixed calibre. The fibrous tissue of the mitral ring, as Sibson showed by dissection, is so thin opposite the central attachment that practically the orifice is only partially surrounded by it, and hence the orifice dilates and contracts with the dilatation and contraction of the ventricles, this being effected by the sphincter *What holds the opening against the internal pressure is not a rigid ring, but the tonus and spasm of the circular band of fibres.*

The researches, among others, of Chauveau and Faivre, and later of Hesse, have demonstrated that during systole the circumference of the base of the ventricle and of the auriculo-ventricular openings is contracted to a high degree. In other words, the auriculo-ventricular openings contract during systole and dilate during diastole. Hesse[2] actually succeeded in obtaining casts of the ventricular cavities in diastole and systole, and in obtaining hardened hearts in the same stages, and from these he made sections. Hesse's results are shown by these diagrams. The great difference in the dimensions of the auriculo-ventricular openings is noticeable, and it is also evident that with the expansion of the base during diastole these openings dilate, and with contraction of the base during systole they contract. As these findings are actual casts and sections of the ventricular cavities, it is difficult to see that they do not represent possible variations in the physiological size of the auriculo-ventricular openings. On the other hand, it is not safe to conclude that these findings represent the actual variation in normal diastole and systole during life, but only that they are the possible limits of

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[1] Among these Sir Wm. Broadbent should be particularly mentioned.

[2] The method employed was the following: The ventricles of a dog's heart immediately after being excised were subjected to the pressure of a column of blood equivalent to 150 mm. Hg., and a plaster cast then taken. Then, the chambers being emptied, the heart was plunged into a saturated solution of bichromate of potash, whereby the muscles contracted without resistance. Thus two casts were obtained representing two conditions: the one representing the heart filled to nearly its full capacity, and the other extreme contraction.

physiological variations.   It is true they portray extreme conditions probably beyond any ever observed in immediately successive periods of time in one and the same heart during life.   But nevertheless they demonstrate, and this is the point, that the auriculo-ventricular opening has a varying calibre, that it is capable of being dilated to a large degree and of being contracted by the sphincter muscle to a comparatively small dimension, and that in systole it does contract.

It still remains an unsettled point whether, under *normal* conditions, the action of the mitral sphincter is only supplementary or whether it is necessary, but the following may be stated :

1. The elastic fibrous ring is variable in size under moderate pressure.

2. That without the sphincter action the internal pressure would force the valve, for there would be nothing to keep the orifice from dilating but this muscle, and, therefore, that the sphincter is essential for *maintaining* a sealed orifice, though perhaps not for the apposition of the valves under ordinary conditions.

3. Under ordinary conditions the tonus of the sphincter is sufficient to keep the orifice within such limits that the valves can close it (King, Chauveau and Faivre, Colin, Baumgarten, and others), and, therefore, that merely filling the ventricles with fluid brings the valve curtains into apposition.

4. When for any reason the tonus of the sphincter is diminished or its muscular strength impaired, it may physiologically dilate to so high a degree in diastole that closure cannot take place without the aid of its contraction, or the sphincter may not be able to hold against internal pressure.

5. That under similar conditions the *degree* of contraction of the muscular fibres may not be sufficient to enable the valves to seal the orifice hermetically.

6. It is probable, therefore, that under certain conditions the action of the sphincter is supplementary, and under other conditions it is necessary.

I. Experimental Conditions in which Physiological Dilatation and the Mitral Sphincter are Factors.

Very valuable information on the physiological working of the heart has been given us by the brilliant experimental researches of Roy and Adami,[1] which throw light on the part played by the auriculo-ventricular sphincter in health and disease.   This work does not seem to have received the attention from clinicians that it has from physiologists or that which its practical importance demands.   I shall, therefore, de-

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[1] Remarks on Failure of the Heart from Overstrain, by Prof. Roy and J. G. Adami, British Medical Journal, December 15, 1888.

scribe it here in some detail.   These experimenters undertook to deter-
mine the physiological and pathological effect upon the heart of varying
increase of work done.   The method adopted to increase the work done
was to increase the " pressure against which the heart has to force out
its contents by narrowing the aorta at one or another part of that
vessel."

The volume of the heart and the contraction of the muscular fibres
were measured by special instruments and shown by graphic tracings.

A few of the more striking facts obtained are thus given :

" We may say that as the outflow of blood from the heart is inter-
fered with the maximum pressure within the ventricle increases, this
increase in pressure having a limit.   .   .   .

" Such narrowing of the aorta produces a very evident distention of
both ventricles, which, nevertheless, go on contracting and expanding
in what to the eye seems a perfectly normal manner.   Examination
of the large veins, however, shows that in them, with the great or ex-
treme narrowing just referred to, there is a very visible wave proceed-
ing from the heart with each ventricular systole ; in other words, this
narrowing of the aorta produces regurgitation through both mitral and
tricuspid valves.   The effect, then, of greatly increasing the resistance
which the ventricles have to overcome in the evacuation of their con-
tents, is to raise the intraventricular pressure during systole to a height
varying with the individual heart under observation, and to cause great
expansion of the chambers of the heart with regurgitation eventually
through the auriculo-ventricular valves.

" The heart itself, however, is appreciably affected by such change
in the blood-pressure.   Its size at the end of systole is greater than
with normal arterial pressure—that is, there is not so complete an ex-
pulsion of blood ; while, at the same time, its expansion during diastole
is also greater.   .   .   .   The result is, that when the arterial pressure
rises the volume of blood in the heart, both at the end of systole and at
the end of diastole, is increased.   Analogous results are produced when
the arterial pressure is raised by other methods.   In other words, the
effect of variations in the arterial pressure on the heart is that increased
resistance produces diminution of the systolic contraction of the ven-
tricles, and the quantity of the blood entering the heart in any given
time remaining the same, this diminished contraction is, *cæteris paribus*,
necessarily accompanied by increased expansion in diastole.

" We have seen that in the experiments first referred to the expan-
sion of the heart so produced leads, if extreme, to functional incom-
petence of the auriculo-ventricular valves, an effect which is all the
more readily produced the more fatigued the heart is.

" There is also the fact that increase in the work done, other things
being equal, produces diminished completeness of contraction in systole,
and, therefore, an increase in the residual blood in the ventricle.   This
physiological dilatation of the heart with increased work becomes, when
excessive, the cause of failure of the organ from overwork, or over-
strain, as it is generally called ; in other words, in such cases the heart
goes on contracting and sending out all the blood which reaches it (ex-
cepting, of course, the residual blood) until the moment when, either

from increase in the arterial pressure, or from weakness of the heart-muscle resulting from fatigue or from disease of its walls, *the muscles at the basis of the ventricles no longer in systole narrow the auriculo-ventricular orifices to a degree which permits of these orifices being closed by their valves, these not being capable of expanding to the same extent as the muscular substance of the heart.*"

It will be observed that Roy and Adami interpret the regurgitation as due alone to the physiological dilatation of the sphincter. But from their experiments it is not clear that the closure of the valves may not at the same time be further hindered by the dilatation of the ventricular wall, which, carrying the papillary muscles with it, pulls apart the valves. Probably both factors co-operate. Prof. William T. Porter informs me that he has observed in dogs this physiological dilatation of the heart when working against increased arterial pressure brought about by contracting the aorta.

Roy and Adami made a further very extended series of observations upon the effect upon the heart of both direct and reflex excitation of the vagus and augmentor nerves. The excitation of the vagus, they find, among other things, to produce substantially the same effect as when the arterial resistance is increased, namely, a physiological dilatation.

The consequence of this dilatation is that the amount of blood expelled at each beat may be doubled, trebled, or even quadrupled. The increase of the residual blood may be so great that, as can be seen from the cardiometric tracings, *the volume of the heart at the end of systole may be greater than was the volume of the organ at the end of diastole before the vagus nerves had been excited.* Nevertheless—and this seems to me to be a point of some significance in its bearing upon the capacity of the sphincter muscle to close the mitral valve completely in conditions of dilatation—the ventricular contractions are less completely made; *there is less complete systolic shortening of the ventricular fibres*, due to the more distended condition of the ventricles and the increased contraction-volume. This being the case, the systolic constriction of the auriculo-ventricular orifices must also be less complete. The effect is the same, whether the vagus be directly stimulated or indirectly by reflex action, excepting that in the latter case an important element may be added, namely, a rise in the arterial pressure which still more tends to dilate the heart. Stimulation of the vagus may further cause physiological irregularity of the heart, as a necessary consequence of the arrangement by which the vagus governs the heart.

An opposite effect is observed when the *nervi augmentores* are excited *directly and alone*, for then, beside an acceleration of the heart-beat, the force of the ventricular contractions is increased so that the ventri-

cles contract more completely and diminish the amount of residual blood, in spite of the fact that the arterial pressure is raised at the same time.

But when the augmentors, alone or together with the vagi, are *indirectly* excited by stimulation of a sensory nerve, the effect upon the expansion of the heart often resembles that seen in excitation of the vagus, for the rise in arterial pressure is not always completely counterbalanced by the increase in the force of the heart's contraction, and the heart becomes expanded in diastole and systole.   In other words, the result is physiological dilatation.   It is obvious that this reflex excitation more nearly approximates the physiological excitation which occurs in the organ, however great the divergence may be, and though these experimental effects may not exactly express what does normally occur, they demonstrate the possibilities.

As Roy and Adami point out :

" The importance of this want of accordance between the increase in the force of the left ventricle and the increase in the work which it is called upon to do, can hardly, we think, be overestimated, and in a future section we will make such comments upon it as appear to us of practical interest to the physiologist and the physician ; in the meantime we need only say that the physiological dilatation of the left ventricle, which often enough shows itself in spite of augmentor action is, in the hearts of healthy, well-fed animals, moderate in amount, and does not lead to any diminution of the output of the organ.   In the case, however, of animals with weak hearts, this physiological dilatation may assume excessive proportions, and may lead to failure of the auriculo-ventricular valves and diminution of the output of the heart ; in other words, to heart failure from inability to meet an increase of work which a healthy, well-fed heart can bear without difficulty."

One of the most valuable results of the work of Roy and Adami has been to show that the heart within purely physiological limits is not an organ of definite size, but contracts and expands in accordance with an automatic mechanism by which it adapts itself to the work to be done, and when expanded the circular fibres shorten less than when the heart is of smaller dimensions.   It is a pump, but a pump that changes its size from time to time according to the work it has to do.

There is, then, such a thing as physiological dilatation and physiological incompetence.   They represent the adaptation of the organ to the work to be done.   Pathological dilatation differs from the physiological variety only in degree, and is a result of the same law, viz., a disproportion between the work to be done and the power to do it.   One may shade into the other when the forces that produce physiological dilatation become excessive.   It is then quite possible that from purely physiological variations of the working of the heart we may have disturbances of its functions which are essentially the same in character as those met with in pathological conditions, namely, valvular incompetence, irregularity, and other variations of rhythm.

II. Clinical Conditions of Health in which Physiological Dilatation and the Mitral Sphincter are Factors.

While Roy and Adami were pursuing their experimental studies the reader was engaged in a series of observations on the clinical side, but which in some respects took on the character of an experimental study, namely, the action of the heart under intense nervous stimulation, as shown by the occurrence of murmurs.[1] For some years previously I had noticed, in examining the applicants for the Boston Fire Department, a very unusual and to me, then, unaccountable frequency of heart murmurs. The conditions of the examination were such that a large proportion of the men were under strong emotional excitement. This was shown by the frequent occurrence of violent heart action, general nervousness, and tremor of limbs and voice. A systematic study was finally undertaken ; the heart was intentionally artificially stimulated as much as possible by the method of examination. The applicant was ushered into the room without warning of what was to occur ; he was urged to be quick in his movements and prepare himself as rapidly as possible, and the heart was examined as the first event. The ordeal was made as exciting as possible, and, as a matter of fact, the heart in a large proportion of cases was found to be working under intense stimulation and doing—if the force of the heart's beat on the chest-wall and the loudness of the sounds be criteria—an increased amount of work. It is important to bear this in mind in studying the results.

The total number of cases in the first series examined was eighty-six. Of these nine were thrown out on the ground of disability from organic disease, there being evidence of an enlargement in six, and in one of irregularity. The rejection of seven of these I now think was a mistake. However, in the seventy-seven remaining, mitral systolic murmurs were heard in twenty-five. So-called exocardiac or cardio-pulmonary murmurs were taken into account, examined for and excluded. Still, I feel sure that in some instances these were confused with endocardiac murmurs, and the total frequency of murmurs thereby increased. In a second series of eighty-five cases exocardiac murmurs alone were heard ten times, while in fourteen cases true endocardiac murmurs were heard.

To determine the relation of these murmurs to nervous excitation, in the first fifty-six subjects the heart was examined under the same conditions as in the first series ; in the last twenty-nine the heart was examined last, after reasonable time had been given to the applicant to become accustomed to the ordeal. The result was that in the first fifty-six subjects the mitral systolic murmur was heard eleven times, and an exocardiac (cardio-pulmonary) murmur nine (or more) times.

In the last twenty-nine subjects a true mitral murmur was heard only three times and an exocardiac murmur once.

In a third series (not hitherto published) out of a total of 103 individuals, and omitting two cases in which there *might* have been organic disease, systolic murmurs at the apex were heard in 21.

As corroborative evidence of the occurrence of these murmurs *under these conditions,* I asked Dr. J. H. McCollom to note the number he found independently in his examination of applicants for the Police Department. He stated that in a first series he found 27 mitral murmurs in 200 men, and in a second series of 111 men, 18 such murmurs.

In a *fourth series* of my own the conditions of the examination were altered so as to eliminate all emotional excitement. The result was that only a so-called pulmonic systolic murmur was heard three times, once being accompanied by a " mitral systolic of a temporary character," but heard after forced expiration. Hundreds of cases have been examined in the same way since this time. Only occasionally in a nervous individual will a functional murmur be heard, perhaps in 1 or 2 per cent. of the cases.

I have given the statistical results of these observations, but I do not wish to lay any great emphasis upon the figures from the point of view of *interpretation* of the sounds heard. Only one who is in the habit of making examinations of this kind can realize the difficulty of always correctly distinguishing between an exocardiac or cardio-pulmonary murmur and a true mitral murmur. They sometimes simulate each other in an extraordinary way. In some cases the short time given to interpret the character of a murmur, owing to its rapid evanescence with the allayment of nervous excitement, makes it extremely difficult to classify it correctly. This and the fact that many exocardiac murmurs in their physical peculiarities closely resemble true mitral murmurs, in spite of all rules regarding their differences, make it certain in my mind that some of these murmurs, though tabulated as endocardiac, were really exocardiac. For instance, it was only lately that I had the opportunity to listen to an extremely loud systolic murmur at the apex. It was heard still louder in the axilla, and was plainly heard in the back. For this reason for the moment I thought it was mitral, but I was soon able to make out that the pitch and quality were pulmonary, and it was heard to the left rather than over the apex. There was another murmur of different quality to be heard at the apex, but this was probably transmitted from the base, where there was a so-called " pulmonic " systolic murmur. Both subsided after a few minutes. The first murmur I believe to have been cardio-pulmonary.

I do not, therefore, lay any stress upon the statistical frequency of this mitral murmur. The figures I have given are, I have no doubt, too high. The important fact is that, without reference to fre-

quency, a greater or less number of murmurs indicative of mitral regurgitation do occur under the conditions of observations, viz., extraordinary nervous excitation of the heart. As I have already described[1] at some length the character of these regurgitant murmurs, and given the reason for this interpretation, a brief statement on this point must suffice.

1. Their physical characteristics, including location, point of maximum intensity and transmission fulfil all the requirements of a mitral murmur.

2. The only murmur for which they could be mistaken is the cardio-pulmonary, and in doubtful cases, not uncommonly two distinct systolic apex murmurs could be heard, one distinctly cardio-pulmonary ; the other evidently must have been regurgitant.

3. They were persistent after forced expiration.

4. In a large number of cases, a systolic murmur of similar character was plainly audible in the second left intercostal space, either close to or about one and a half inches from the sternum, the so-called pulmonic murmur, which is regarded by many observers (Balfour, Naunyn, and others) as due to mitral regurgitation.

5. They are sometimes heard at the junction of the fourth rib and sternum on the left (i. e., over the mitral valve).

6. The pulmonic second sound, as might be expected, is rarely relatively or absolutely accentuated, owing undoubtedly to a synchronous rise of arterial tension and because of the small amount of mitral leakage.

In my first communication the explanation which was given of these mitral murmurs was that *under strong nervous excitement the powerful contraction of the circular fibres of the heart so increased the pressure within the cavity of the ventricle[2] that the mitral sphincter is forced, so to speak, that is, it is either dilated or prevented from contracting sufficiently for a complete closure of the auriculo-ventricular orifice. Thus a functional regurgitation occurs.*

This mechanism I still believe to be an important factor in the case, but in the light of Roy and Adami's experiments the question of a possible accompanying and co-operative physiological dilatation of the heart assumed importance. It, therefore, became imperative that these observations should be repeated for the purpose of making accurate measurements of the size of the heart.

At the time of my first series of observations (1888) it never occurred to me, nor was it generally known, I think, that the healthy heart might dilate under conditions of increased effort (aside, of course, from quasi-pathological fatigue following excessive muscular exertion), so that

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[1] Medical Record, April, 1888.   [2] The same thing may be true of the right ventricle.

when evidence of enlargement occurred the case was thrown out as possibly organic. *Six cases*, as before mentioned, *were rejected for this reason*. This, in view of later evidence, I believe to have been an error, and I am convinced that these cases were merely examples of functional dilatation. For in the first place, nine cases out of eighty-six men are far too high a proportion for heart disease to exist in presumably healthy men in the prime of life; and, second, I do not find anything like that proportion of existing organic disease under the present conditions of examination.

The third series of observations was, therefore, made for this purpose. Slight enlargement is not easy to demonstrate. Percussion is a very inexact method when precision is required, as has been shown by F. H.
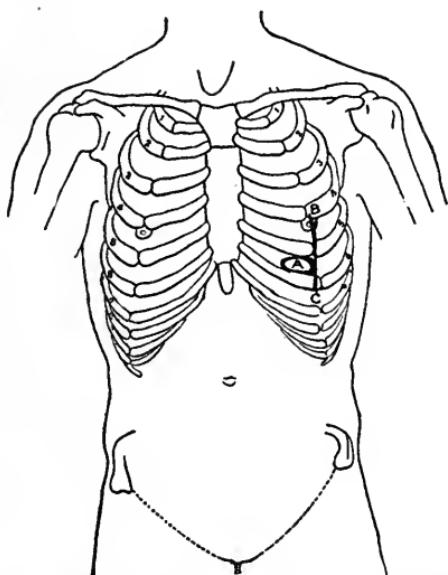
FIG. 1.	FIG. 2.
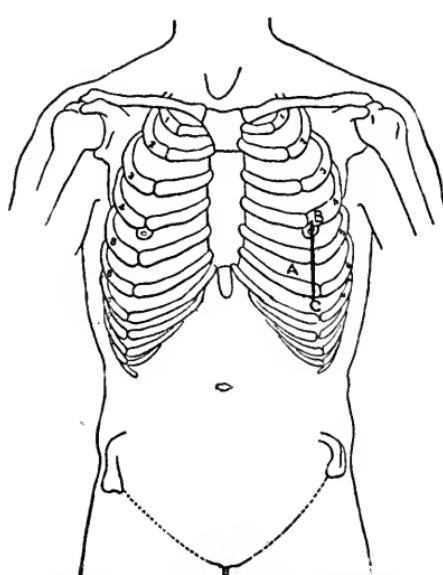
FIG. 1.—No. 42 (August, 1889). The apex-beat (A) was violent and occupied a larger area than usual. In this and Fig. 2 the line of dulness along left border only of heart is shown.
FIG. 2.—No. 85 (same date). Loud and low-pitched mitral systolic murmur.

Williams' observations with the radiograph.[1] Percussion dulness cannot always be relied upon to correspond exactly with the outline of the heart. The position of the apex (as well as the apex-beat) of the heart is sometimes more exact, but it also has its fallacy aside from tilting.

Nevertheless, in this series I was able to satisfy myself of the presence of fugitive enlargement to the left in quite a number of cases. In them the line of dulness along the left border of the heart extended through the nipple, and the apex-beat could be seen or felt in this same line, and even well outside of it. Sometimes at the end of the exami-

[1] Philadelphia Medical Journal, January 6, 1900.

nation it could be seen that the apex had receded to its normal territory
and the line of dulness had also receded—that is, as the excitement
subsided the heart retracted.   Thus, in about 10 per cent. of all cases
an enlargement to the left was present, sometimes without murmurs.
(See Figs. 1, 2, and 3.)   Fig. 3 is particularly interesting.   It is a late
observation, and was made by first outlining the heart on the chest-wall
by percussion, and then transferring by tracing-paper.   The continuous
line is that of cardiac dulness at the time of nervous excitement; the
broken line the same after the heart had become quiet.   The difference
in the size of the heart is quite remarkable.   The enlargement is to the

FIG. 3.
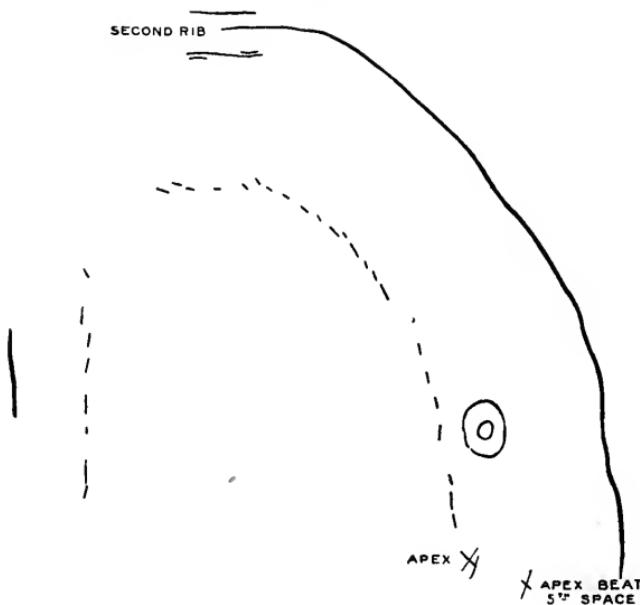
From tracings. Heavy line = cardiac area (dulness) during excitement; enlargement to
right as well as to left and upward; broken line = same after subsidence of excitement same
day and also six days later. $\times$ = apex-beat.   During period of excitement, May 19, 1900,
heart's action irregular, "pulmonic systolic" murmur (in left auricular area), loud cardio-pul-
monary murmur to left of apex; after cessation of excitement disappearance of murmurs, and
heart normal in every way. May 25th, heart still normal.

right as well as to the left and above.   The extension of dulness upward
is interesting in connection with the experiments and observations of
Foxwell, who has shown that this feature is characteristic of the condi-
tion of the heart in which the so-called pulmonic systolic murmur is
heard.   He offers experimental evidence to show that it is due to the
dilatation of the conus arteriosus, and the murmur to a distortion of
the pulmonary artery, the dilatation itself being the consequence of
debility.   In the case from which this diagram was made at the time of
the enlargement and excitement, the heart's action was irregular, and a

systolic murmur was present in the second space, heard loudest over the left auricle—that is, about one and one-half inches from the sternum. It was this case in which the very loud (presumably) cardio-pulmonary murmur (p. 195) was heard.

During the course of the examination the heart became quiet and retracted in size, and then the murmurs disappeared. Six days later, when examined again, the heart was still in every way normal.

I have thus been able to convince myself that in a certain proportion of cases the presence of dilatation is of a temporary nature. The following may be cited as examples :

No. 7 (already mentioned). At first, while the murmur was present, the apex-beat could be detected outside of the mammillary line. Later, at the end of the examination, the apex receded inside the mammillary line, but close to it.

No. 12. Mitral systolic ; a strong apex-beat outside the mammillary line ; heart action rapid and violent. A loud systolic murmur could be heard over the aortic orifice ; also over the pulmonic. It may have been this murmur that was continued to the apex. Subject very nervous, voice tremulous. Later, murmurs disappeared, heart became quiet, and the apex-beat scarcely visible, and retracted close to but within the mammillary line.

No. 14. Heart-sounds normal ; apex-beat in the mammillary line ; heart's action violent. Later, the apex-beat receded inside the mammillary line.

No. 31. A rough mitral systolic murmur at the apex ; apex-beat in the sixth space at the inner edge of the mammillary line.

No. 37. Mitral systolic murmur ; percussion dulness extended on the left through the mammillary line. When examined some days later all these murmurs had disappeared and the line of dulness had retreated to within normal limits.

No. 42. At the beginning of examination, mitral systolic murmur, which later disappeared. Heart's action rapid and supernormal in strength ; apex-beat could both be seen and felt close up to the mammillary line, extending over a wider area than normal. The line of the percussion dulness extended also through the mammillary line.

No. 58. First sound at the apex normal, but a systolic murmur could be heard over the aortic opening and continued in the carotid. The apex-beat could be felt with the finger in the mammillary line, and percussion gave the left border of the heart as extending through this line. When examined a few days later all these murmurs had disappeared and the line of dulness had retreated to within normal limits.

In some instances, as would be expected, there were evidences of enlargement of the heart without any signs of incompetency of the valves ; for example, Nos. 14, 34, and 36. In a great many instances when I have examined these subjects some days later under circumstances that allayed all apprehension, the murmur previously heard had entirely disappeared, as well as all signs of cardiac dilatation. To these cases I would also add the six instances in the first series of observations,

which were eliminated because of the enlargement of which I had found evidences, and because of which I had concluded that they were probably of organic origin.

In the light of these findings, then, I think we may conclude that under intense nervous stimulation of the heart, *presumably tending to increase the work done,* there may occur a physiological dilatation of the heart similar to that which occurs when the pressure is raised by the methods employed in the physiological experimentation already referred to, and that the mitral sphincter also shares in this physiological dilatation. This means that its contraction—that is, the shortening of the circular fibres—is less complete, and the orifice is larger at the end of systole than normal. In consequence of this and of the increase of internal pressure, the contraction of the sphincter may be impeded, or the opening may even be expanded by the hydrostatic pressure, and the valve may become incompetent and regurgitation may take place.

I have omitted various details of these observations for the sake of brevity. It ought to be noted, however, in evidence of the intense stimulation of the heart that was usually present, that murmurs were frequently heard over other regions of the heart than at the apex. (Sir W. Broadbent has lately pointed out the frequency of murmurs over the various orifices of the heart in subjects undergoing civil-service examinations, and to this extent has corroborated the accuracy of these observations. He warns against the danger of mistaking them for evidences of organic disease.) The heart's action was usually increased in rapidity, sometimes to a very high degree, and its action was often violent and tumultuous. The apex-beat was sometimes diffused over an area of about double the extent of that which is normal. It was quite common to have all these signs disappear during the course of the examination, even while one was listening, and to see the increased cardiac area retract within normal dimensions.

In line with these observations of my own are those of Dr. John C. Munro,[1] who made an investigation into the condition of the heart in fifty-seven patients before and after surgical operations. The conditions before operation were considered to be those of apprehension and nervousness. Of the fifty-seven cases there was a group of fourteen in whom there were evidences of cardiac disturbance before operation, all signs of which disappeared as soon as the operation was over. In thirteen of these cases there was a systolic murmur at the apex ; in the other one a presystolic murmur. Beside these there were six other cases which exhibited functional disturbances which persisted after the operation, while eight, it was thought, had well-marked organic disease, a very high and suspicious percentage. These findings of Dr. Munro seem to be corroborative of the observations which I have just recorded.

[1] Boston City Hospital Reports, Series VIII., 1897.

In 1890 Theodor Schott demonstrated by examining the hearts of strong, healthy men, before and after wrestling, that strenuous exercise, when intense, though of short duration, brings about a temporary dilatation of both sides of the heart. After a few minutes' severe wrestling, continued to a point to produce dyspnœa, an enlargement, shown by percussion, was produced both to the right and to the left from one to two centimetres and more. This dilatation duly subsided after a short rest ; it does not appear, however, from Schott's observations, that the mitral sphincter was physiologically incapacitated by this dilatation, for he failed to find any regurgitant murmur, nor is any mention made of pulmonic murmurs, a rather striking contrast with the findings of others after long-continued and violent exercise sufficient to produce exhaustion. Schott interpreted this dilatation as the expression of an overstrain of the heart, and so stigmatized it with a pathological soubriquet. Overstrain is a clinical term, and is not descriptive of the physiological or pathological process. It may mean much or nothing. From the fact that there was no evidence of regurgitation it must be presumed that the contraction of the auriculoventricular sphincters were still sufficiently extensive to close the orifices. From this and also from the fact that the wrestling was continued only three or four minutes, we are compelled to conclude that neither the internal pressure was sufficient to force the sphincters, nor was there true fatigue or excessive dilatation. A more correct interpretation would seem to be that the dilatation observed was simply physiological and identical with that observed in animals when the heart is called upon to do any great increase of work.

There is an economy in this physiological dilatation. According to mathematical laws, when the heart is dilated—that is, when the circumference is increased—a smaller amount of contraction will suffice to throw out a larger volume of blood. For instance, if the heart were a sphere of ten inches in circumference a contraction of the circumference of one inch would throw out 4.5 cubic inches of blood, while if it were only five inches in circumference the contraction would throw out only a little over one cubic inch,[1] and this is what occurs in physiological dilatation. A greater amount of blood is thrown out at each systole with diminished contraction. With a dilatation of moderate amount the degree of contraction is sufficient to close the auriculoventricular orifices. But if the dilatation is excessive, either from great increase in the work to be done or weakening of the cardiac muscles, the contraction may not be sufficient in extent to close the orifice. As a rule, even with considerable dilatation, so long as the muscle is not fatigued, the contractions of the sphincter are sufficient,

[1] Roy and Adami.

but when fatigue sets in the contractions become shorter, the dilatation greater, and incompetency results.

It is interesting in this connection to notice that Schott found that by constricting the abdomen with a belt, and thus increasing the amount of blood flowing into the right ventricle, and thereby the amount of work to be done by the heart, the dilatation was thus further increased. This is in entire corroboration of the experimental observations on animals (Roy and Adami, Fry and Krehl), which have shown that compression of the abdominal veins causes dilatation of the heart by increasing the total output—that is, the work done. (Therein is a practical suggestion as to the possible ill effect of tight lacing.)

Later, in 1897, in another and similar series of experiments, Schott confirms these earlier observations by means of the skiagraph. The X-ray showed that the enlargement of the heart from side to side after strenuous exercise, wrestling, might be as much as 3 or $3\frac{1}{2}$ cm. He also demonstrated the same thing after severe walking or bicycling. Undoubtedly fatigue of the cardiac muscle enters as an element in this cardiac dilatation when the enlargements follow persistent and long exercise, and itself is persistent. Very interesting in this connection is the series of clinical cases which Schott gives of persistent dilatation of the heart following extended muscular exertion. This enlargement took on a pathological character, and more correctly may be regarded as the expression of overstrain of the heart or muscular fatigue. This dilatation followed various forms of muscular exertion, including bicycling, manual labor, and dancing combined with tight lacing. The symptoms were disabling and those usually observed in cardiac incapacity.

III. Quasi-pathological Conditions, in which Physiological Dilatation and the Mitral Sphincter are Factors.

In Schott's experiments there was no mitral incompetency, or at least this was not revealed by auscultation. It was otherwise with the observations of Williams and Arnold of the hearts of the contestants in a Marathon running race of twenty-five miles. These are among the most valuable facts thus far recorded to determine the effect of fatigue upon the *human* heart. Of the ten men examined both before and after the race, seven showed after running a relative increase of the cardiac dulness extending to the left. It is interesting to note that the line of dulness corresponding to the left border of the heart, as shown by the published diagrams, extended through the nipple and agreed very closely with the same line which I found in my own observations where there was increase of the cardiac area and with some of Schott's cases. In eleven out of thirteen men, murmurs were noted. In all cases these were systolic, and the authors, after an extended discussion, interpret them as of mitral origin. In explanation of this the authors adopt

the view that fatigue induced a dilatation of the walls of the heart, including the mitral sphincter. In consequence of this physiological dilatation the auriculo-ventricular valves closed imperfectly, and regurgitation was allowed to take place.

Curiously enough, almost on the same day that Williams and Arnold presented the results of their observations to the Climatological Association, Stengel reported to this Association a similar series of observations of the hearts of athletes before and after running. He also found enlargement, and in some cases this enlargement was accompanied by mitral regurgitation. Stengel remarks that he has noticed the ease with which a systolic murmur developed over the hearts of men in the early part of their training for the football field when they are presumably out of condition. In a special trial of nine of the candidates he found that three promptly developed a very distinct murmur of this kind after a little exertion.[1]

[Since this paper was presented the writer had an opportunity to take part in the examination of the Marathon runners this year. For certain reasons the examination of the hearts was not entirely satisfactory. Murmurs were not heard, owing, probably, to tardiness in the examination, but enlargement was plainly demonstrable in most cases.]

The interest of these phenomena lies in the fact that they represent a general law. The dilatation and incompetency must be held to be the physiological result of increased work done, with diminished power to do it. Under the primary increased stimulation the heart expands and throws out a greater volume of blood ; then the organ becoming fatigued the power is diminished and thereby the work is relatively still further increased, dilatation increases, and incompetency finally follows.

These observations of Stengel, with those of Williams, and Arnold, and my own, seem to me to be a complete physiological confirmation on the human subject of the experimental work by Roy and Adami on the dog's heart.

IV. PATHOLOGICAL SYSTEMIC CONDITIONS IN WHICH PHYSIOLOGICAL DILATATION AND THE MITRAL SPHINCTER ARE FACTORS IN DETERMINING CARDIAC DISTURBANCES.

As is well known, there are quite a number of conditions in which temporary mitral systolic murmurs are heard, often with enlargement. The most common conditions which these murmurs accompany are anæmia, Bright's disease, gout, arterial sclerosis, chorea, the infectious fevers, like diphtheria and typhoid, and even rheumatism. In some of these conditions there is presumably a weakened heart muscle—e g., infectious diseases and anæmia and other adynamic states. In others

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[1] Transactions of the Association of American Physicians, 1899 vol. xiv.

there is an increase of the arterial tension (Bright's disease, gout); in all cases enlargement is not infrequently present. Now, what I wish to point out is this : That the physiological principles underlying these cardiac disturbances is the same as in the experimental and other conditions which I have already discussed, and that the disturbances of function more nearly approximate physiological than pathological variations.

In my original paper I put forward the theory, as did also at the same time Roy and Adami, that the mitral systolic murmurs in these conditions represented physiological regurgitation due to incomplete contraction of the mitral sphincter ; but to Donald MacAlister is due the credit of priority for this explanation, the first suggestion coming to him from Hesse's casts. As Roy and Adami put it : " When from any cause the muscular power of the heart is diminished, whether from imperfect blood-supply, fatty degeneration, or impaired quality of the blood, or from any of the known causes by which the power of contraction of the heart is impaired, we have a condition in which the relation between the work required of the organ and its power of doing that work is affected in an analogous way to that which occurs when the work of the heart is increased and its power remains constant."[1] In Bright's disease and gout we have an increase of the work to be done while the power remains unchanged ; in the febrile diseases the work remains the same, but the power is diminished.

As all experienced practitioners are familiar with the murmurs occurring in adynamic states, it is not necessary to describe them at any length. In the course of Bright's disease it is not uncommon to observe evidences of temporary regurgitation from the left ventricle. I may cite here, for illustration only of what I mean, the case of a patient who was in the advanced stages of chronic Bright's disease, and also suffered from attacks of gout of a severe nature. The heart was very much enlarged, but no evidence of mitral incompetence, as a rule, could be detected. There were evidences of very high arterial tension. Every now and then he suffered from attacks in which a very loud mitral systolic murmur was heard at the apex. At such times marked œdema and congestion of the lungs were noticeable. Later these signs of mitral failure would disappear. Such attacks are usually called acute pathological dilatation or heart failure. The proper interpretation of cases of this kind unquestionably is that under the extremely high tension present there occurs a *physiological*, not pathological, dilatation of the mitral sphincter with diminished contractions, preventing complete closure of the valve. The work to be done becomes augmented, the heart physiologically dilates, but, not being strong enough to meet

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[1] " Failure of the Heart from Overstrain." In other words, the mechanico-physiological effect is the same, whether the power remains constant and the work is increased, or the work remains constant and the power is diminished.

the strain, dilates too much and allows incompetence. With the disappearance of the high tension the muscle contracts again and the incompetence disappears.

Diphtheria offers a particularly favorable opportunity to study cardiac insufficiency due to weakness of the muscle, for it is known that the toxin affects both the pneumogastric nerve (and presumably the augmentor nerves) and the muscle substance. It is, then, a good type of that class of affections in which the auriculo-ventricular sphincters are weakened, and as such I speak of it. First-rate data for such a study are furnished by the reports and observations of many hundred cases in the Boston City Hospital made by McCollom[1] and Hibbard.[2] From a study of two series of cases (one, 800, and the other 252 in number) Hibbard found that a " systolic murmur at the apex, with an accentuated pulmonic second sound, and often with some enlargement of the cardiac dulness, is seen in about 10 per cent. of the diphtheria cases during the course of the disease." This murmur is temporary, for in twenty-four cases kept continuously under observation, it disappeared within three weeks in twenty-one cases and within eight weeks in the remaining three. The enlargement was found to extend in some cases in children as much as two centimetres outside the normal limit. Out of 121 fatal cases McCollom noted a mitral systolic murmur in eighteen cases, or nearly 15 per cent., and of these eighteen an enlargement was detected in six. In only one was there an enlargement without a murmur. An analysis of the cases which were fatal, chiefly from heart complications, and in which an autopsy was held (twelve in number), is instructive. Of these twelve a mitral systolic murmur was heard in seven. The auriculo-ventricular valves were found dilated *after death* in three, one or both ventricles dilated in five, and the heart enlarged by weight in eleven.[3] It must not be forgotten that the absence of dilatation either of the openings or the cavities after death is not evidence that it did not exist during life, as it is well known that after death the cardiac muscle contracts strongly (King, Sibson, and others).

A sufficient cause for the muscular weakness is found in the known action of the diphtheritic poison on the nerves of the myocardium. Thus, of five cases of mitral insufficiency the pneumogastric nerve was found diseased in all.[4] It is an instructive fact, and one demonstrating that marked dilatation is not essential for physiological regurgitation, that out of the eighteen mitral systolic murmurs McCollom reports

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[1] A Clinical Study of Eight Hundred Cases of Diphtheria at the South Department of the Boston City Hospital. Boston City Hospital Reports, 1898, Ninth Series.

[2] Heart Complications in Diphtheria. Ibid.

[3] The cause of increased weight was not determined.

[4] In every case (9) where the nerve was examined it was diseased. In some the myocardium also was degenerated.

that no enlargement of the cardiac area could be detected in twelve. This properly interpreted means *that the mitral sphincter may not sufficiently contract, even though the dilatation is not sufficient to be detected by the usual methods of physical diagnosis.*

In view of the post-mortem findings, the mitral murmurs in this class of cases unquestionably represent regurgitation. In those cases where regurgitation occurs without the coexistence of dilatation the only intelligible conception of the conditions present is that the mitral sphincter is so weakened by disease that it does not sufficiently contract against even a normal or subnormal arterial tension.

In those cases where there is dilatation there does not seem to be any reason to suppose that the etiological principle is not physiological rather than pathological, or that it differs in any way from that which has been experimentally demonstrated to obtain in healthy animals. The work to be done by the heart is relatively increased—that is to say, the work remains the same, but the power is diminished ; hence the heart is called upon for increased effort, and physiological dilatation results. This dilatation again increases the difficulty of the auriculo-ventricular sphincter.[1] Thus it is that the muscular inefficiency of the heart calls into play the physiological law of increased work. In other systemic conditions, like arterio-sclerosis, as I have said, there is no weakness of the cardiac sphincter, but an excessive increase of the work to be done (increased arterial tension).

V. Pathological Conditions of the Heart in which Physiological Dilatation and the Mitral Sphincters are Factors in Determining Disturbances of the Organ.

Space will not allow me to do more than allude to some of the perturbations which complicate the phenomena of cardiac disease and which are occasioned by these physiological factors.

If these factors, dilatation and sphincter action, are physiological laws, *they must be universal in their action, and affect diseased as well as normal hearts.* And hence it well may be that, looked at from this point of view, some of the commonly observed manifestations of heart disease may really be physiological in principle, exaggerated perhaps by the fact of the organ being incapacitated.

From the point of view of practical therapeutics this distinction at once becomes important. The conditions of " overstrain " of the heart, with relatively persistent dilatation and mitral incompetency, " fatigued heart," " curable mitral regurgitation " and acute dilatation, I need not

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[1] In extreme cases, when the dilatation is excessive, the mitral incompetency may be caused or increased by the bulging of the walls, which, carrying away the chordæ tendinæ, prevents the valve flaps from coming into apposition. In most cases the dilatation is too slight for this.

more than allude to, as they have already been discussed. They are substantially one and the same condition, originating in and growing out of physiological dilatation from increased work. It may be that the difference between the physiological and the pathological is only one of degree. The tremendous strain sometimes put upon the heart necessarily induces a dilatation. To this "fatigue," as yet an incompletely known condition, becomes added and the dilatation becomes persistent.

The mitral sphincter necessarily shares in the inefficiency. When we bear in mind that by simply increasing the work the volume of the healthy heart may be so increased that its size at the end of systole may even be greater than it was before at the end of the diastole, and that the volume of blood thrown out may be quadrupled, we can appreciate the dilatation that may be affected by the enormous exertion to which the heart is sometimes subjected, and yet be physiological. Add to this "fatigue" and loss of muscular tone and the effect of the law is apparent. It was only lately that I was called to pass upon the condition of a man who had undergone great muscular exertion and had fallen down unconscious. On recovery he had developed persistent symptoms of cardiac disease, with dilatation (dizziness, pain, palpitation, cyanosis on exertion, etc.). He had been examined by several competent physicians, all of whom, I am told by the attending physician, diagnosed the case as "myocarditis." The subsequent history bears out the opinion that it was one simply of physiological dilatation and overstrain.

In fatty degeneration and other degenerative diseases of the heart the weakening of the myocardium tends to weaken the sphincter and make the heart dilatable under very slight exertion.

In valvular disease, especially in aortic stenosis, the increased work which the heart is called upon to perform tends to increase the normal dilatations which occur from time to time and to make less complete the action of the sphincters. In this way it seems to me are to be explained many of the acute dilatations and temporary mitral regurgitations which occur in the course of aortic disease. The increase of power coming from hypertrophy has the tendency to keep the dilatation within physiological limits, but sooner or later this compensation becomes inefficient.

The further application of these principles is readily made, and need not be further discussed.

All the observations to which I have referred in Sections I. and II. are particularly instructive as pointing to the very large variation that may take place in the size of the heart of the human being under actual conditions of life, and be within physiological limits. They render comprehensible that within physiological limits the mitral valve may fail to do its share in the closure of the mitral orifice. They contribute

to what might be regarded as the modern conception of the heart's workings and of a certain class of cases of mitral insufficiency which formerly were regarded as purely pathological, but now are recognized to be due to muscular weakness, and curable. The experiments on animals enable us to understand the *modus operandi* of the Nauheim treatment, for it has been experimentally shown that excitation of the peripheral nerves may reflexly stimulate the augmentor nerves of the heart, and through them increase the force of the contractions and the completeness of the systole, and diminish the quantity of residual blood —*i. e.*, diminish the size of the heart.[1]

A distinct recognition of physiological dilatation and physiological incompetency of the valves, apart from the pathological varieties, is of the utmost clinical importance aside from the advantages of precision of thought and precision of knowledge.

I feel quite certain that a clear understanding of these principles will help us enormously to a true conception of cardiac phenomena, whether accompanying organic disease or not. In any given case our first question should be : Are the conditions (murmurs, dilatations, irregularity) in part or wholly physiological, and, therefore, in part or wholly, temporary or permanent, curable or incurable ? Upon the answer will largely depend both the immediate treatment and the rules for prophylaxis.

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[1] Roy and Adami.

REVIEWS.

SURGICAL ANATOMY. A TREATISE ON HUMAN ANATOMY IN ITS AP-
PLICATION TO THE PRACTICE OF MEDICINE AND SURGERY. By JOHN
B. DEAVER, M.D., Surgeon-in-Chief to the German Hospital, Philadel-
phia. In three volumes, illustrated by about 400 plates, nearly all drawn
for this work from original dissections. Vol. I., Upper Extremity, Back
of Neck, Shoulder, Trunk, Cranium, Scalp, Face. Vol. II., Neck, Mouth,
Pharynx, Larynx, Nose, Orbit, Eyeball, Organ of Hearing, Brain, Male
Perineum, Female Perineum. Philadelphia: P. Blakiston's Son & Co.,
1900.

THE very handsome work, of which the first two volumes are before
us, has proved one of the most difficult to review justly that we have
met with for a long time. Let us glance at the modern history of
anatomical teaching in order to gain a criterion of criticism. In the
earlier part of the century just passed anatomy was essentially descrip-
tive. In other words, it consisted of the successive and isolated study
of the various so-called systems—the bones, muscles, arteries, nerves,
etc. Something was said of the chief and most important relations of
vessels, but in the main everything was considered by itself, it being
apparently assumed that the learner would have the genius to combine
these isolated facts. Surgical anatomy—the complement of descriptive
anatomy—was for the most part limited to certain parts of the body
where operations were most common. Probably more was written of
the anatomy of the region of hernia than of any other; the male
perineum, on account of operations for stone or stricture, coming next.
Then there were the directions for the classical operations of the liga-
tion of arteries and of certain amputations. Fasciæ received a great
and probably an undue share of attention. The methods employed
were those of dissection only, and the modern methods were unknown.
Now surgical anatomy may mean the application of anatomy to the
needs of surgery in those regions in which operations are likely to be
performed, or it may be used as a synonym for topographical anatomy
in its largest sense, by which we mean the relations of each part of the
body with all its neighbors considered, not in the dissected or mutilated
body, but on the living one; and treating of parts which under only
extraordinary circumstances can be exposed to the scalpel, but whose
relations are of great importance in the fields of diagnosis and pathology.
In the past generation a change that is indeed revolutionary or
rather a series of changes have swept like waves over the field of
anatomy. First of all, we have had the rise of the system of frozen
sections and window cuts by which topographical anatomy took a great
step and became less distinctly surgical. It is not too much to say
that the normal form of many of the internal organs is only now being
learned. The study of muscular action by Duchenne has been a great

step in applied anatomy. To the great changes in our ideas, especially of the central nervous system, wrought by embryology, we can but allude. Altogether the change has been immense since the days when the requisites for distinction in anatomy were pretty much limited to neat dissection and a good memory. Putting aside all purely scientific considerations, we may now say that the idea which above all others it is most important to get the student of medicine thoroughly to grasp is that both the physician and surgeon have to do with living men and women whose organs are not at all in the condition in which the student generally sees them. The knowledge he requires is of the shape and relation of the parts in the living body, not of them when isolated and distorted by post-mortem changes and by the very act of dissection. Now, surgical anatomy to be really good must be founded on this want. It should involve not only the knowledge of the parts most likely to be operated upon, but that of the whole body. At the same time some parts are of infinitely greater importance than others. Some structures in such a work should not even be mentioned, while others cannot be described too thoroughly. Physiological considerations can by no means be neglected. We need to know how a muscle acts and what is, in consequence, the result of its want of action or of its perverted action.

It is safe to say that the reader on opening these volumes will first give his attention to the plates, which are numerous and beautiful. By way of criticism we must say that many of the illustrations are decidedly too large. What is to be gained by devoting a whole page to the auricle or to the eyeball? The result is sometimes coarse, and even when it is not a diminishing glass shows how much preferable a smaller scale would have been. We should take up much space were we to give praise in detail, but we must mention the beautiful and instructive views of the middle ear shown both by section and dissection. The sections are, with a single exception, very good indeed. Those of the male and female pelvis are admirable. We wish that this method had been employed very much more freely. The one which we have called an exception is a median section through the nose, mouth, and pharynx. It is evident that the specimen had been detached from the spine. If we are not very much mistaken the mouth and pharynx have been distended with some foreign substance, hardened, and cut. What is the result? We see in the first place that the pharynx and œsophagus bulge backward, presenting a space that is not there in life; that there is a large space between the tongue and the roof of the mouth, and that the soft palate presents a graceful but perfectly impossible curve in mid-air. Now this is not a true section in the sense that those made on untouched bodies hardened either by cold or formalin are, and the idea that it gives is a wrong one. It is the section not of the true pharynx, but of an artificially prepared one. We dwell on this because it is an error incidental to what we consider the great defect of the work.

This defect is the method and point of view. To exemplify this, let us take as an illustration the first part, which deals with the upper extremity. First comes the surface anatomy, beautifully illustrated and well done, followed by special directions for nerve stretching and nerve section. Then the skin being removed (and what a perfect view there is of the subcutaneous tissue) we come to the parts beneath. The rela-tions of the axillary fascia are finely shown and further explained by a diagrammatic section, and the relations of the lymphatics, especially

those of the breast, are well treated.   It is when we get into the arm
and forearm that the faults we object to so strongly become accentuated.
The muscles, vessels, and nerves are described *seriatim*.   In some cases
these are treated with what one may call personal attention, but too
often the description is short, perfunctory, and too suggestive of that to
be found in a compendium.

It seems a pity to give the space in a work of so great scope to what
the reader should be supposed to know already, especially (and now we
come to the heart of the matter) when these descriptions are given one
after another.   There should have been either much more or very much
less.   There are errors, too, that one would not expect.   Thus the ex-
tensor communis digitorum is described as inserted into the second and
third phalanges.   It is known that practically its action is on the first
and that the others are extended by the muscles of the hand.   Indeed,
in another place the true insertion is correctly described and finely
figured.   All the joints, from those of the clavicle down, are succes-
sively described, and by no means fully.   In short, we have here the
old method of giving us isolated parts when what we want is all those
parts together.   The anatomy of the bones is almost completely ignored,
though surely there is a good deal worth saying about their shape at
different levels and the varying thickness of the solid osseous tissue.   In
the section on amputation it is thought advisable to enumerate the
various structures divided.   We beg leave to quote from the description
of amputation through the middle of the forearm :   '' The anterior in-
cision is semilunar, with its convexity downward, passes from one border
of the forearm to the other, and divides skin, superficial fascia, the
radial, median, and anterior ulnar veins, the anterior branch of the
musculo-cutaneous nerve, the anterior branch of internal cutaneous
nerve, cutaneous branches of the radial and ulnar arteries, the deep
fascia, the flexor carpi ulnaris, the ulnar vessels and nerves, the flexor
sublimis digitorum, the palmaris longus, the flexor carpi radialis, the
median nerve and artery, the flexor profundus digitorum, flexor longus
pollicis, the radial vessels and nerve, and the supinator longus.''   We
spare the reader the contents of the posterior flap.   The time was when
we should have looked upon this as the summit of anatomical erudition,
but those days are long past.   Here is our complaint in a nutshell : the
anatomy is essentially that of a past epoch.   It were easy to cite in-
stances in support of this criticism.   Take, for instance, the orbicularis
oris and the muscles mingling with it.   There is no hint at the present
view that even the existence of the orbicularis as a real muscle is at
best very problematical, and that others which are here described as
ending at the angles of the mouth form a large part of it.   In the ac-
count of the brain and cord we find that sensory nerves are still sup-
posed to have their origin within the central nervous system.   Nothing,
however, shocks us more than the position of the kidneys in the dia-
grammatic figure of the relations of the viscera to the back.   It is hard
to conceive how they could have been so placed by one at all familiar
with the sectional method of studying the abdominal viscera.

Perhaps we have given too much weight to this fundamental criti-
cism, but we must write as we think.   If we do not praise more it is
not because we cannot find much to praise.   As an example of terse,
correct, and facile description, take that of the course of the hypoglossal
nerve.

We do not doubt that the book will appeal to many, and, indeed, we can but wish success to so much painstaking and conscientious work, though the author's idea of a topographical and applied anatomy is not ours.   T. D.

FORTY YEARS IN THE MEDICAL PROFESSION, 1858–1898. By JOHN JAN-
    VIER BLACK. Philadelphia : J. B. Lippincott Company, 1900.

IT is observable in connection with the wide-spread increase of inter-
est in all matters bearing on the early history of this country that there
has also been shown a marked desire on the part of medical men to
learn more of the rise and progress of their profession in America.
The proceedings of medical societies and the medical journals have of
late contained many contributions bearing on the subject which have
served to show what an incompletely-worked mine of material lies at
the disposal of those inclined to delve in it. Few books of real value
on medical history in the United States have been published since 1828,
when old James Thacher published his *American Medical Biography*, a
book of surpassing worth and interest. Thacher had been a surgeon in
the American Army during the Revolution, and he wrote from personal
knowledge of the medical worthies of his day—Rush, Morgan, Shippen
and the others whose zeal gave the impetus which has placed medi-
cine in its present exalted state in this country. Dr. S. W. Williams,
in 1845, published a continuation of Thacher's work, containing bio-
graphical sketches of physicians who had died subsequent to 1828, neither
of the books containing articles on physicians yet living at the date
of their publication. At a later period Dr. Toner published several
pamphlets which, though containing much valuable information, were
incomplete and sketchy. After the death of Dr. George W. Norris, of
Philadelphia, his son, Dr. William F. Norris, had privately printed
some manuscript notes which his father left, under the title of " The
Early History of Medicine in Philadelphia." This is a most interest-
ing book, and very complete and accurate as far as it goes. Another
very interesting publication is Dr. S. A. Green's *Centennial Address*
before the Massachusetts Medical Society, in 1881. These may be con-
sidered the chief published sources of our knowledge of the beginnings
of medical science in this country. In older countries there is a pro-
fuse literature on medical history. Probably the best-known book on
the subject in the English language is *The Gold-headed Cane*, which
was first published in 1825, and appeared in a fourth edition in 1884.
It purports to be the autobiography of a cane which had belonged in
succession to the famous physicians—Radcliffe, Mead, Askew, Pitcairn,
and Baillie, the latter's widow depositing it in the Royal College of
Physicians. It is a most fascinating little *jeu de esprit*, and should be
read by every physician who wants a few hours of recreation. In Ger-
many there are professorial chairs for the teaching of the history of
medicine, and the lectures are said to be well attended and of great
interest and value to the students.

It is a trite saying that the conversation of doctors generally possesses
great interest, because of the many phases of life and society with which
they are thrown in contact in the performance of their professional

duties. It is curious to observe, however, that the autobiographies or biographies of physicians are rarely entertaining even to their professional colleagues, and that such books generally have very little literary merit. Of course, there are exceptions, such as *The Life of Marion Sims*, but they only serve to prove the rule. While there are hundreds of books of biography and sketches of lawyers, clergymen, and soldiers, transmitting anecdotes of their learning and wit, which are read and enjoyed by the veriest laymen, the great procession of physicians and surgeons passes along, leaving as almost its only literary record a series of technical books and articles which become antiquated within a few years after they are written, or a few jejune eulogies which are too dull and mendacious to repay perusal. Dr. Black has wisely refrained from calling his book an autobiography. In the preface he speaks of it as the flotsam and jetsam of his forty years of active practice, and the phrase well suits the nature of the book. In a hasty view of the events of Dr. Black's life it would not seem as though they had been of such a nature as to possess any great interest to those not personally acquainted with him. In 1860 he entered the medical department of the University of Pennsylvania, and, graduating after the usual two years of study, he served as a resident physician in the Philadelphia Hospital (Blockley). In 1866 he went to Europe, and on his return entered upon the practice of his profession in the little town of New Castle, Delaware, where he has remained in active work ever since. Surely one would not be disposed to expect anything out of such a career justifying the publication of its history. But on reading the book one is agreeably disappointed. Dr. Black gives us the details of the course of study at the University, chiefly consisting of didactic lectures. There was no practical work in chemistry, and during his whole course he did not once look through a microscope. While a resident at Blockley there was an epidemic of typhus fever in its wards, and he describes the measures employed in its management. His description of the life of the medical student and the hospital resident of his time is very amusing. The great value of the book, however, lies in the author's vivid descriptions of the medical giants of those days with whom he was thrown in contact. His accounts of the great men who then made Philadelphia famous as a centre of medical learning—Pancoast, Gross, George B. Wood, and many more—describing their personal appearance and characteristics and their methods of working, are admirable. When he went abroad, in Paris he saw the work of Nelaton, Civiale, Trousseau, Velpeau, Ricord, and the great clinics held by them in the city's famous hospitals. In Berlin, Grafe, Langenbeck, and many others held his attention. He points out that Vienna then as now possessed unsurpassed clinical and pathological facilities, and he grows enthusiastic when recalling memories of the great leaders of the profession in England. These reminiscences and descriptions are wonderfully vivid and readable.

There is another feature of the book which consists in a presentation of the author's views on the many medical and surgical topics which have fallen to his experience in his professional life. From the details of a major surgical operation to the subject of animal extract therapy we find a full exposition of what Dr. Black holds the right view of the matter, given in the utmost detail. In one chapter he discusses ptomaines and autointoxication; in another the varieties of edible

fruits; in another rheumatism; in another surgical procedures and antisepsis. The subjects are all gone into in minute detail and occupy many pages. They show the author's active interest in every new development in medical science, but we wish he had continued his accounts of, the men and things of former times and not given us a mass of information which we could readily obtain from our text-books. However, let us pardon this in consideration of the very many interesting pages which accompany it.

Dr. Black has evidently throughout his long life been a keen observer, and the alertness of his mind is indicated by the relish with which it grasps these new things. It is greatly to be wished that more medical men would emulate Dr. Black's example and write their memoirs for the edification of subsequent generations. Such autobiographies are of the greatest service, whether their authors have been eminent in their lives or not. If the latter lot has befallen them, let them then tell us about those who were more successful; if they have achieved eminence, let them recount the steps by which it was attained. Medical science is yet young in this country. Let us treasure up all we can concerning its progress. F. R. P.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D. Vol. III. and IV., September and December, 1900. Philadelphia and New York: Lea Brothers & Co.

We have already commented upon Vols. I. and II. of this series, and in doing so set forth their merit and their title to wide circulation.

Vol. III., the third issue for the year 1900, is taken up with a discussion of the Diseases of the Thorax and Its Viscera, including the Heart, Lungs, and Bloodvessels; Diseases of the Skin, Diseases of the Nervous System, and Obstetrics. The diseases of the Thorax are reviewed in a most comprehensive fashion by Dr. William Ewart, of London, than whom there are few more capable of handling it. The pages devoted to croupous pneumonia, pulmonary tuberculosis, and cardiac and general stimulants are particularly satisfactory in their presentation of the winnowing of a vast literature.

The contributions to Diseases of the Skin are considered by Dr. Henry W. Stelwagon. His review will commend itself to the general practitioner, because it bears the evidence of the author's personal opinion and because much space is devoted to treatment. The same applies also to the epitome of the literature of Diseases of the Nervous System, which is contributed by Dr. W. G. Spiller. The digest of the literature on brain tumor and spinal tumor is particularly commendable. The important additions to clinical neurology are set forth in a comprehensive and attractive manner, and the epitomist's comments are sound and to the point.

Dr. R. C. Norris, who considers the literature of Obstetrics, is impressed, after reviewing the recent contributions, by the growth of obstetric science, and remarks briefly that bacteriology has revolutionized obstetrics as it has surgery. Such an epitome as that presented

under " management of pregnancy and labor " can scarcely fail to be
appreciated by the general practitioner, especially as it is supplemented
by a summary of the line of treatment followed by the writer—a recog-
nized teacher. The review concludes with an excellent and deserving
summary of Hirst's valuable article on coccygodynia.

In Vol. IV. Dr. Max Einhorn requires but seventeen pages to review
the literature of Diseases of the Digestive Tract and Allied Organs,
Liver, Pancreas, and Peritoneum. It can scarcely be expected that an
adequate account of the great number of contributions can be made in
such space, especially as the larger portion of it is taken up with the
writer's personal contributions to this literature.

The chapter on Genito-urinary Diseases and Syphilis is from the pen
of Dr. William T. Belfield. The consideration of syphilis is particularly
inadequate. This is one of the few chapters in the series that the re-
viewer has found distinctly disappointing. In marked contrast is the
succeeding chapter on Surgery, a most praiseworthy and commendable
review by Dr. Joseph C. Bloodgood. It gives the reviewer great pleas-
ure, after having carefully read the 130 pages contributed by this
writer, to testify that it conforms in every particular to his ideal of
what such a review should be.

Diseases of the Kidneys are considered by Dr. J. R. Bradford, of
London. Albumosuria, alkaptonuria, cystinuria—terms probably un-
familiar to most general medical readers—receive considerable space.
The pages devoted to skin eruptions occurring in Bright's disease are
well allotted.

Dr. A. P. Brubaker contributes a brief review of General Physiology,
a large part of which has very " practical " application ; and Dr. H.
B. Baker a readable review on progress in Hygiene.

The concluding chapter, one which we venture to say will be more
studiously conned and perhaps frequently consulted than any in the
series, is a Practical Therapeutic Referendum, by Dr. E. Q. Thornton.
Herein are displayed the new tools of the doctor's workshop, and some
attempt is made to put a personal estimate upon their value.

Taking a retrospective glance at the volumes of *Progressive Medicine,*
the reviewer is of the belief that they fulfil their purpose successfully
and adequately.   J. C.

A Text-book upon the Pathogenic Bacteria for Students of
   Medicine and Physicians. By Joseph McFarland, M.D., Professor
   of Pathology in the Medico-Chirurgical College, Philadelphia, etc. Third
   edition, revised and enlarged. Philadelphia : W. B. Saunders & Co., 1900.

The issue of a third edition of this book attests the favorable recep-
tion accorded it, and even a brief inspection shows the care that has
been taken to keep it abreast of the rapid advances made by this branch
of medical science. The new edition contains almost double the reading
matter of the first issue, which appeared in 1896.

On taking up a work on bacteriology one almost instinctively turns
to the pages on infection, immunity, and serum-therapy, topics of fas-
cinating interest from a purely scientific stand-point, and of vast prac-
tical importance. This section has been entirely rewritten, and an
unusual amount of space devoted to the problems involved, which are

presented in an admirable manner, though perhaps more fully than need be for the class of readers to whom the book is addressed. It is, however, probably the most complete discussion of these matters contained in any text-book in English, and those interested will find here a clear exposition of the various theories advanced from time to time with the arguments for and against them. The author falls into the error of giving credit to Ogata and Jasuhara for making the first observation on the protective power of immune blood, in 1890, an honor belonging to Babès and Lepp, who, in 1889, at the Pasteur Institute, carried out experiments to determine the protective power of the blood of animals immunized against rabies with a certain amount of success.

The chapters on Diphtheria and Typhoid Fever are especially interesting. In the former a full description of the methods of producing antitoxin and its standardization is given, subjects on which the author is well fitted to speak by his large practical experience. The latter treats at length of the Widal reaction and its application to the diagnosis of this widely distributed disease. The serum-therapy of the various diseases treated of receives a fair amount of attention, and the manufacture of the different " vaccines " is described.

The entrance of some errors into a book of this scope is possibly unavoidable. Certainly it is easier to pick a book to pieces than to construct one. The present work is not entirely free from errors, and some of the most noticeable must be pointed out.

The description of rabies as a " specific toxæmia " is scarcely borne out by our knowledge of this malady. The inoculation of rabbits under the dura mater with the medulla of a dog dead of rabies is said to produce the disease in about six days, while in a second rabbit inoculated from the first, " a more violent form of the disease in a shorter time " is caused. The period of incubation in the first instance is usually about three weeks, and seldom less than fourteen days. Only after a long series of inoculations is the period of incubation reduced to as short a time as six or seven days, and this is the strongest virus obtainable—the " fixed " virus of Pasteur.

In discussing tuberculosis we are told that " in bovine animals and sheep the infection is usually first seen in the alimentary apparatus and associated organs, and may be limited to them. Pulmonary disease sometimes occurs." In cattle as in man the lungs are the chief seat of tuberculosis. Statistics collected by the German Government show that the lungs are affected in 75 per cent. of all cases, and in this country we have more recent figures from two sources—one giving 78.4 per cent., and the other 60 per cent. as the proportion.

Some mistakes have crept also into the make-up of the book. The section on Bovine Tuberculosis has been placed in the middle of the section on Fowl Tuberculosis, and statements concerning the avian bacillus are made to appear as a part of the discussion of the mammalian organism. A number of typographical errors occur, and several of the authors quoted have their names badly misspelled.

Lack of space forbids the mention of many admirable features which deserve notice. As a whole, the book contains a clear and reliable exposition of the science of bacteriology as applied to medicine, and like the former editions will doubtless receive a cordial welcome.

It is well illustrated, and is printed in the attractive style characteristic of the publishers.   M. P. R.

ATLAS DER NORMALEN UND PATHOLOGISCHEN ANATOMIE IN TYPISCHEN
RÖNTGENBILDERN. Die angeborene Luxation des Hüftgelenkes (congeni-
tal luxation of the hip-joint) von Geh. Med.-Rat. Professor Dr. MAX
SCHEDE. Hamburg: Lucas Gräfe u. Sillem, 1900.

ATLAS OF NORMAL AND PATHOLOGICAL ANATOMY IN TYPICAL RÖNTGEN
PICTURES.

THIS work is a monograph of twenty-three pages, to which is appended
a series of forty-four excellent reproductions of skiagraphs, which serve
to illustrate very graphically the subject-matter of the text. The author
goes over the subject of congenital dislocation of the hip systematically,
setting forth his own views in matters in which he disagrees with the
commonly accepted teachings of the day. After a brief historical
sketch the author takes up the etiology, the direction of the primary
luxation, incomplete luxation, and the pathological anatomy of the
parts concerned. The hypothesis of Dollinger, who attributes this
congenital malformation to a premature union of the epiphyseal lines
in the acetabulum, the author is inclined to discredit. Such a phe-
nomena as Dollinger describes will not be met with in more than 1
per cent. of cases, and should not, therefore, be regarded as an etiolog-
ical factor.

Whatever may have been the condition in the first and second year
of life, there is no doubt that in the majority of cases the head, at the
time of the first observation, is displaced upward and backward, or, in
other words, that the dislocation is upon the dorsum ilii.

Of the commonly described alterations in the structure of the head
and neck, such as the flattening of the head and the variations from
the normal angle between the neck and shaft, by far the most impor-
tant, from the therapeutic stand-point, is the disturbance of relation-
ship between the upper and lower ends of the femur. The upper end,
and, therefore, the head, is in a position of outward rotation, while the
lower end occupies a position midway between outward and inward
rotation. The author continually emphasizes the absolute necessity of
taking advantage of our knowledge of this fact when considering methods
of reduction and methods of retention. The greater part of the
monograph is devoted to the most interesting phase of the subject,
namely, the treatment. Of the relative merits of the methods of
Mikulicz, Hoffa, Paci, and Lorenz, the author considers the latter
the most rational, for the methods of Mikulicz and Hoffa are only ap-
plicable to cases in which retention is attended with no great difficulty,
while that of Paci is objected to on the ground that its application is
limited also to a particular group of cases. Exception is taken to the
position in which Lorenz places the limb after reduction, viz., that of
outward rotation. According to Schede, no position seems to make
reluxation easier than that of outward rotation ; therefore, after reduc-
tion the fixation dressing should be applied with the limb rotated in-
ward. On the assumption that the position of outward rotation is one
which favors reluxation, the author recommends the performance of a
subtrochanteric osteotomy by which this deformity of the upper end of
the femur may be corrected. The operation is not performed until one
and a half to three months—according to the resistance offered by the
external rotators—have elapsed since reduction was effected, during

which time the limb has been in a position of abduction and inward rotation.

The technique of the operation : Every precaution being taken to prevent reluxation during its performance, a gold-plated steel needle is thrust in through the trochanter, neck, and half way through the head of the femur, the end of the needle projecting some 3 cm. from the cutaneous surface. By means of this needle the upper fragment can be placed after the osteotomy in the desired position. Having divided the bone just below the small trochanter by a linear subcutaneous osteotomy, the lower fragment is rotated outward until the patella looks directly forward, and with the limb in this position the plaster dressing is applied. The needle is not removed until union is firm, which will be about the fifth week. From this time on for a period of three to six months a plaster dressing reaching to the lower third of the thigh must be worn, together with a brace connecting the cast with the shoe, by means of which the limb is retained in the proper position. As to the results and the justifiability of such an operation, the author expresses his unqualified approval of it, and believes that with its adoption not only will a number of hitherto unimproved cases be materially improved, but a great percentage of all cases be cured. (This operation is precisely similar to one recommended by Kocher to correct the torsion of the upper end of the femur met with in coxa vara.) After commenting upon his method of reduction, the author in conclusion presents some statistics based upon his personal observations in 268 luxations in 182 children. Following the classification of Peterson to Group A, or that in which reposition was complete and the ultimate result perfect, belong forty-one patients with fifty joints, fourteen going without apparatus ; to Group B, or that in which the head occupies a position in the upper and outer edge of the acetabular rim and in which function is good, belong sixty-one patients with sixty-six joints ; in Group BC, that in which the head was displaced still further outward toward the anterior superior spinous process of the ilium, and in Group C, in which the head is immediately beneath this process, were (BC) nineteen children with twenty-six joints, and (C) twenty-seven with thirty-six joints ; ten patients with sixteen joints belonged to Group CD, which corresponds somewhat to the class of supracotyloid and iliac luxations described by Lange. In twenty-two cases the treatment was for some reason given up, and in twelve cases, all between seven and fifteen years of age, either the luxation was irreducible or the head could not be retained after reduction. Of the series in which perfect results were obtained (Group A) 22 per cent. were cases of bilateral luxation as compared with 34.4 per cent. in Group B. Of the total number 111 were under seven years of age, the remaining seventy-one over seven.

The reproductions, which have been made from first-class skiagraphs, are most instructive and enhance to no small degree the value of this monograph as a work of reference. By one interested in congenital luxation of the hip, a subject which of recent years has attracted so much attention, this monograph will be read with interest, inasmuch as it represents the views of a noted clinician based upon experience and personal observation with a remarkably large series of cases. Of additional interest is the author's contribution to the treatment—subtrochanteric osteotomy—an operation which he is prepared to indorse

after its performance in some fifty cases—an addition to the mechanical therapeusis of this deformity, which he believes will be found to be of the greatest assistance in preventing recurrence after the luxation has been reduced.   C. H. F.

TEXT-BOOK OF THE EMBRYOLOGY OF INVERTEBRATES. By DR. E. KORSCHELT and DR. K. NEIDER. Translated by Matilda Bernard. Revised and edited by Martin F. Woodward. Vol. IV. London: Swan, Sonnenschein & Co., 1900.

THE appearance of this volume realizes the long anticipated completion of the English translation of this excellent German work. The present part includes the development of Amphineura, Lamellibranchia, Solenoconcha, Gastropoda, Cephalopoda, Tunicata, and Cephalochorda.

The marked activity in the investigation of invertebrates during the eight years that have elapsed since the appearance of the German text has resulted in many advances and greater accuracy in our knowledge of the development of these forms. Such gains necessitate frequent modification, or complete revision, of the accepted views of a decade ago ; the duties, therefore, of the editor of a text-book which shall be a trustworthy guide along scientific paths so subject to change are far from perfunctory. The task imposed upon Dr. Woodward in bringing the account of the development of the mollusks and the tunicates as originally written into accord with the results of the later researches in these groups has been no light one.

The section dealing with the Mollusca has been extensively revised by alterations and additions, so that it offers an excellent presentation of the development of this group. It is to be regretted that the chapters dealing with the Tunicata have not had the advantage of similar revision, since the repeated contradictions given to the statements of the original text by the necessary footnotes by the editor are conducive neither to the pleasure nor the patience of the reader.

The final chapter of the work on the Cephalochorda, by Prof. Neider, presenting an excellent outline of the development of the amphioxus, has a deep interest even for those especially engaged in following the embryology of the highest types, since study of the simplified developmental processes occurring in this low animal has materially aided in appreciating the significance of the complex relations presented in the most highly specialized, including man.

The systematic position of the amphioxus has long engaged the earnest thought of the foremost zoologists. The inclusion of the amphioxus within the discussion of the invertebrates, however, must not be taken as a denial of its generally accepted place at the foot of the vertebrate series, for the author concludes that the animal may be regarded as the " primitive vertebrate," enjoying, however, in a sense a certain independence of position. The view championed by Dohrn, that the amphioxus represents a degenerate form derived from the Craniata, is not accepted, but, on the contrary, the conclusion is reached, based upon the established facts of its ontogeny and anatomy, that this animal represents a very primitive form.

The closing pages of the book are devoted to the broad problem of the ancestry of the vertebrates. After pointing out the inadequacy of

a number of the assumed solutions of this vexed question, the author wisely adopts the conservative view that we are not at present in a position to decide from what primitive form the Chordata have been derived, and that '' the origin of the vertebrates is lost in the obscurity of forms unknown to us.''

The favorable opinion regarding the work of the translator and the character of the illustrations that we had occasion to express in the pages of this journal when reviewing the preceding volumes, is further confirmed. The completion of the work in its revised English dress will be welcomed by the steadily growing ranks of investigators whose admirable work is winning for American morphologists a deservedly high place.   G. A. P.

DISEASES OF THE EYE, EAR, NOSE, AND THROAT. A Pocket Text-book of Diseases of the Eye, Ear, Nose, and Throat, for Students and Practitioners. By WILLIAM L. BALLINGER, M.D., Assistant Professor of Otology, Rhinology, and Laryngology in the College of Physicians and Surgeons, Chicago, etc., and A. G. WIPPERN, M.D., Professor of Ophthalmology and Otology in the Chicago Eye, Ear, Nose, and Throat College. In one handsome 12mo. volume of 525 pages, with 150 engravings and six full-page colored plates. Philadelphia and New York: Lea Brothers & Co.

IN a book of but five hundred pages one cannot expect to find a very complete treatise on diseases of the eye, ear, nose, and throat, and the statement made in the preface by the authors, that the more common diseases of those organs are treated '' with a fulness commensurate to their importance,'' is hardly borne out in their work. The book, however, has many features of much merit. The authors have in a concise and clear manner described the symptoms and treatment of affections of the eye, ear, nose, and throat as they present themselves to the student and general practitioner. They have not filled their pages with anatomical descriptions copied from larger books, but have contented themselves with permitting the student to study his special anatomy from numerous well-executed plates. The illustrations throughout are especially good. Only a few of them are original, but these are judiciously chosen. Small text-books of this nature are undoubtedly of the greatest value to the student and general practitioner, and we can heartily commend the one before us as a most complete and practical manual of the essentials of the subjects treated in it.   F. R. P.

A MANUAL OF HYGIENE AND SANITATION. By SENECA EGBERT, A.M., M.D. Second edition. Enlarged and thoroughly revised. Philadelphia and New York: Lea Brothers & Co., 1900.

THIS manual has been revised and new matter added to the extent of sixty-five pages. A chapter on Military Hygiene has also been added. The choice and treatment of the subject-matter, while it does not always conform to that of well-known works on the subject, is probably not directly open to criticism, except that the chapter on Bacteriology appears to be given undue prominence for a work of this nature.
                                                                  D. H. B.

PROGRESS

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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The Tongue in Health and Disease.—J. MÜLLER has re-examined this subject. Considering the regularity with which the tongue is inspected it is not a little remarkable that so little positive knowledge is entertained. Müller reminds us that the coating of variable thickness on the middle of the dorsum of the tongues of most people in middle life is made up of the filiform papillæ. It is, therefore, a fur rather than a deposit, as is so often imagined. The longer the papillæ and the thicker the epithelium, the less does the red color of the tongue show, and the whiter or yellower is the surface. At times the papillæ reach excessive size, the epithelium is horny and contains dark pigment, hence the name "black hair-tongue." As the epithelium becomes loosened and infiltrated by bacterial growth, the cloudy, yellowish-gray appearance is exaggerated, and may be further altered by ingesta such as berries, chocolate, red wine, etc. Milk causes a white appearance by reason of the fat globules. The desquamation of cells and the accumulation of food remnants, mucus, leucocytes, and bacteria cause a coat that can be removed by brushing or scraping. In health this sort of coat never becomes excessive, because it is removed in the taking of food, but in the morning is apparent on account of the resting of the tongue overnight. The author recommends for obtaining an idea of the activity of epithelial growth in the mouth the examination of sediment obtained by chewing bits of sponge and squeezing out the fluid (bits of rubber tubing are more convenient). In the morning the sediment may equal one-fifth the column of fluid. There is a marked difference in the growth of the papillæ at different periods of life, with great individual differences at all ages. In old age the atrophy of the papillæ gives the tongue a glistening appearance, as if varnished. The author thinks there is a parallel between the development of the papillæ and of other epidermoid tissues, as of the skin. He denies a

relation between coated tongue and local diseases of the mouth and throat, except when the former are so severe as to interfere with swallowing. As regards disease, he found a coated tongue by far most frequently in cases of acute disease, whether primarily affecting the digestive tract or not. It is less frequent in chronic digestive diseases, and in chronic gastritis does not occur to so great a degree as in healthy people in middle life. The microscopical examination of the coating shows usually a more rich and diverse material than in health, but in general no essential differences exist. The leucocytes appear to be numerous in cancer of the stomach and tuberculosis. The claim of Bernabei, that specific bacteria can be cultivated in certain diseases from the coating on the tongue, the author thinks worth further investigation. The disappearance of a coating of acute origin is a good sign, because it indicates, usually, that food is properly taken. In chronic diseases the disappearance may have another meaning. The best way of keeping down the coating is by chewing hard food, especially bread. For abnormal coating the use of a soft toothbrush is best.—*Münchener med. Wochenschrift*, 1900, No. 33.

The Pathogenesis of Jaundice.—BROWICZ (*Wiener klin. Wochenschrift*, 1900, No. 35) has brought together the results of investigations on the causation of jaundice, which, if confirmed, will add clearness to our knowledge of that process. His conclusions are : 1. The origin of jaundice rests on the increased function of normal liver cells, which, irritated by various causes, can take up and elaborate excessive quantities of nutrient and functionating material, eventually hæmoglobin, converting these into bile or bile-coloring matter. 2. Only a normal, healthy liver cell that can take up an excess of material and convert it into bile can empty the extra bile into the intercellular biliary canals. From there, partly through cells of the blood-capillaries, the bile reaches the blood. 3. Mechanical factors have only a moderate effect on the origin of jaundice by setting up disturbances of the circulation within the blood-capillaries. 4. The blood capillaries of the acini furnish the usual route to the general circulation, the lymphatic vessels in the vicinity of the larger biliary canals being concerned only to a slight degree. 5. All forms of jaundice can be explained by the method stated—*i. e.*, the increased function of the liver cells.

Hyperglobuly, Splenomegaly, and Splenectomy.—COMINOTTI (*Wiener klin. Wochenschrift*, 1900, No. 39) records two interesting cases that, as he says, rather add to the obscurity surrounding splenic pathology, but at the same time raise a number of questions. One case was that of a woman, aged thirty-three years, without a history of definite disease in early life, but always pale and weak. Menstruation began at twenty-two. At twenty-five the menses ceased, and there was severe pain in the splenic region, so that the patient was sick in bed a month. After one year menstruation returned, but was irregular, and a year and a half before admission it stopped entirely. The pain in the splenic region was often increased by defecation, by long walks, and stair-climbing. There was a history of slight epistaxis every month from the eighteenth year. Dizziness, headache, and congestion were frequent, as was diarrhœa, and at one time there was polyphagia and

polydipsia. When admitted there was scoliosis with compensatory changes in the thorax, traces of rickets, emaciation, and slight cyanosis with a brownish discoloration of the skin. The submaxillary glands were somewhat enlarged. The spleen filled the whole left half of the abdomen ; it was painful and hardly movable. The liver was slightly enlarged. The blood showed pale red corpuscles with slight tendency to roll formation, the cells varying in size. The count was 7,200,000 red cells, 6000 leucocytes, Gowers' 80 per cent. The spleen was removed and found to weigh four and a quarter kilogrammes. No microscopical examination was made. The patient died of sepsis on the fifty-second day. There was no leucocytosis until the preagonal stage. Autopsy merely confirmed the diagnosis of sepsis.

The other patient was a woman, aged thirty-four years, whose spleen was removed in 1891 for malarial enlargement. There was a recurrence of the intermittent fever in four months, which stopped after treatment by quinine. There was amenorrhœa for two years, after that menstruation was regular, without pain, lasting two or three days. Cessation for six months was to be attributed to pregnancy, and to the same cause were ascribed certain dyspeptic symptoms. There was neither vomiting nor constipation. The red corpuscles were pale, the size and shape almost normal. The small mononuclear leucocytes were increased to 47 per cent., the eosinophiles to 10 per cent. There were 5,500,000 red corpuscles and 7500 leucocytes per c.mm., Gowers' 60.

Beside a brief mention of hyperglobuly in various conditions without splenic disease, the author cites the case of Vaquez, with splenomegaly, cyanosis, and hyperglobuly ; that of Vidal, with a remarkable tuberculous disease of the spleen of eight years' duration, associated with increase of the red corpuscles, and those of Montard-Martin and Achard. Such cases emphasize the importance of blood examinations in all cases of enlarged spleen.

Primary Sarcoma of the Stomach.—MINTZ (*Berliner klin. Wochenschrift*, 1900, No. 32) reports a case of this kind, which, with those he has found in the literature and others overlooked by him but given in the report of Dock (*Journal of the American Medical Association*, July 21, 1900), raises the total to about fifty-five, including some not fully recorded. Mintz' patient was a man, aged thirty years, who for one month had complained of eructations, pyrosis, tugging pains in the abdomen, and increasing weakness. Vomiting was rare and the vomitus without striking appearances. For a week before admission the symptoms were severe. Appetite was retained, but the patient avoided food on account of pain. There was rapid loss of weight. For some weeks the left testis had been enlarging. The patient was cachectic and jaundiced. There was a diffuse, firm tumor in the epigastrium, reaching almost to the navel, with a horizontal, movable, cord-like mass passing to the left. Lavage brought up abundant decomposed food-remains, with blood at the last. Hydrochloric acid was absent, lactic present in large amount, with Oppler-Boas bacilli and no sarcinæ. The diagnosis was carcinoma of the pylorus with metastasis in the testis. An operation for gastroenterostomy showed that the tumor occupied the right half of the stomach. Death resulted in four days. Autopsy revealed adhesions between the pylorus and the liver ; in the pyloric region a hard tumor the size of a

fist, spreading out toward the fundus in a diffuse manner. The mucosa in the pylorus was the seat of an ulcer 2 cm. wide, occupying almost all of the circumference. The lymph glands in the lesser curvature were much enlarged, as also those in the hepatoduodenal ligament. With the exception of the testis, there were no other metastases. The growth proved to be a lymphosarcoma. The author gives a résumé of the clinical features of sarcoma of the stomach, and thinks it should be considered more frequently in the diagnosis of gastric tumors.

The Etiology of Yellow Fever—A Preliminary Note.—REED, CARROLL, AGRAMONTE, and LAZEAR (*The Philadelphia Medical Journal*, October 27, 1900, p. 79), who were appointed a commission by the United States Government to study the acute infectious diseases prevalent in the Island of Cuba, give in a preliminary report the result of their observations on the etiology of yellow fever, of which they made a special study.

The first part of their work was devoted to an investigation into the relationship of the bacillus icteroides (Sanarelli) to yellow fever.

From this part of their work they draw the following conclusions :

1. The blood taken during life from the general venous circulation, on various days of the disease, in 18 cases of yellow fever successively studied, has given negative results as regards the presence of B. icteroides.

2. Cultures taken from the blood and organs of 11 yellow fever cadavers have also proved negative as regards the presence of this bacillus.

3. Bacillus icteroides (Sanarelli) stands in no causative relation to yellow fever, but, when present, should be considered as a secondary invader in this disease.

These observers were much attracted by the theory of Carlos J. Finlay, of Havana, advanced in 1881, that yellow fever was propagated by the mosquito. The researches of Ross and the Italian observers on the part the mosquito plays in the propagation of malaria encouraged the belief that the mosquito was also probably the intermediate host of the germ of yellow fever. They carried out a series of experiments in which they allowed nonimmune individuals to be bitten by mosquitoes that had previously fed on yellow fever patients. The mosquito used in all cases was Culex fasciatus Fabr. Eleven subjects allowed infected mosquitoes to bite them. Of these only two developed yellow fever. The negative results in the other nine cases are in large part attributed to the fact that the mosquitoes were fed on patients with very mild forms of the disease ; also in part to the fact that the mosquito was allowed to bite the non-immune individual too early after it had bitten the yellow fever patient. In the two positive cases intervals of at least twelve and sixteen days had elapsed. The possibility of infection in any other way was practically excluded in these two cases. In a third case, Dr. Lazear, one of the members of the commission, while in a yellow fever ward, allowed a mosquito that had lit on his hand to bite him and to satisfy its hunger. Five days later he began to feel ill, and subsequently developed a typical attack of yellow fever which unfortunately proved fatal. While the possibility of infection from another source could not be excluded in this case, the writers are inclined to the view that the mosquito bite was the probable cause.

From the second part of their investigation the commission felt justified in drawing the following conclusion :

The mosquito serves as the intermediate host for the parasite of yellow fever, and it is highly probable that the disease is propagated only through the bite of this insect.

[Two comments may be made on this most important paper : First, the unwarrantable character of the experiments on human beings—unless (which is not stated) with the full consent and full knowledge of the subjects ; secondly, the altogether too positive conclusion from such scanty data as to the part played by the mosquito.—W. O.]

Optic Neuritis in Chlorosis; Death with Symptoms of Brain Tumor.—ENGELHARDT (*Münchener med. Wochenschrift*, 1900, No. 36) reports the following rare and instructive case : A girl, aged eighteen years, with good family history and previous health, became anæmic at the onset of puberty, five years before admission. She tired easily, menstruation was irregular, and pain in the back of the head was so severe as at times to make work impossible. This continued with remissions until October, 1896, when the patient had to give up work. Toward the end of the year vision became poor, headache was almost unbearable, and in a few weeks blindness was complete. There was choked-disk, with œdema and exudation in the retina. A diagnosis of brain-tumor was made, and mercury used by inunction, but without effect. At that time there was no vertigo, no vomiting ; the mind was clear ; syphilis could be excluded. Admitted to the medical clinic, the patient could distinguish light and darkness ; the bulbs were freely movable ; pupils wide, not reacting to light or convergence. There was lack of definition of the optic papillæ, the disks grayish-white and cloudy, surrounded by hemorrhages and radiating, glistening white spots and streaks. The sense of smell was lost. The right arm was weaker than the left, the right fingers paræsthetic ; co-ordination was good ; there was no Romberg symptom ; the knee-jerk weak in the left side, absent on the right. The blood showed 3,000,000 red corpuscles per c.mm., leucocytes not increased, Fleischl 50 per cent. A diagnosis of brain-tumor was again made, inunctions again used, without any effect on the blindness. For three weeks there was anorexia, with great emaciation. Soon nystagmus appeared, the right arm grew weaker. The knee-jerk reappeared on the right side, and became exaggerated on the left, with ankle-clonus on both sides. Headache returned, without tenderness on percussion of the skull, but subsided again. In July, 1897, epileptic attacks began, coming on with a cry, followed by loss of consciousness and general convulsions, without biting the tongue. Soon after deviation of the head and eyes to the right was observed, and at times divergent strabismus. The right facial nerve was paretic, the right arm weak, the right side of the body anæsthetic. Swallowing was difficult ; the temperature-sense lost, sense of pain weak and slow. The convulsions were not Jacksonian in type. Lumbar puncture, repeated four times, was negative. After a period of partial improvement the mind became weaker and convulsions began again, and with the convulsions, at four different times, there were severe attacks of herpes of the lips, once on the nose. With another return of the headache the general condition became worse, the right

leg was paralyzed. The optic nerves were then completely atrophied, motion in the bulbs good. In March, 1898, death occurred after a period of great restlessness, in which the paralyzed extremities were moved as freely as the others. The clinical diagnosis was tumor in the left hemisphere, behind the central convolutions, in the ocular fibres of Gratiolet or the posterior part of the internal capsule, explaining the anosmia and deviation by irritation. Autopsy showed nothing but general anæmia, with anæmia and dryness of the brain.

The author quotes part of the literature of optic neuritis in chlorosis, the only apparent cause in the present case, but without finding a satisfactory explanation of the pathology. Severe congestion, inflammation and atrophy seem to be the steps in the course of the lesion. The numerous other symptoms that during life led to the diagnosis of tumor can be as readily explained by a neurosis, such as hysteria.

[With the other diagnosis no effort was made to treat the chlorosis, so that the possibility of a different outcome must be a matter of conjecture. The rule in therapeutics, to treat the patient and not the disease, might have been followed with advantage, even if the blindness was inevitable.—G. D.]

Queirolo's Method for Determining the Stomach Boundaries.—EDEL and VOLHARD (*Deutsche med. Wochenschrift*, 1900, No. 35) have tested this method, and find that while in general it is not superior to simple distention with CO_2, yet in some cases it gives useful information. The method consists in passing into the stomach a double tube, opening into a rubber bag at the lower end and connected at the outer end by one tube with a Marey's drum, by another with a stop-cock. After filling the bag in the stomach, the abdomen is lightly percussed. According to Queirolo, the needle moves on the drum only when the stomach is percussed. Queirolo did not make comparative tests. The authors compared the results with those obtained by percussing the stomach distended by CO_2 after marking on the abdomen the outline obtained by the other method. They found a striking agreement, not only over the lower boundary, but also at the fundus. In the liver region there was no advantage in the new method, both being unsatisfactory. [Palpation, at least in some cases, would have been valuable in outlining the lesser curvature, but is not mentioned by the authors.—G. D.] In some cases simple distention gave a lower boundary. Percussion in any part of the abdomen causes movement of the needle. This is especially the case in the navel region, but practice usually enables one to distinguish such motion from the vigorous movements produced when the stomach itself is percussed. Pain or anything causing tension of the abdominal wall lessens the movement. If the stomach is entirely empty when the method is used the results are unsatisfactory. This was shown by a case of pancreatic cyst compressing the pylorus. At first only the fundus was distended by the bag, but after distention with CO_2 the bag showed a stomach outline corresponding with that indicated by the gas. In a case of pyloric insufficiency, in which the CO_2 always passed rapidly into the duodenum, Queirolo's method was very effective in showing the actual shape and position of the stomach, as proved by operation. The authors believe that in case of new-growth the method is not as trustworthy as simple distention, but in cases of suspected abnormal

distensibility they think it may be of some value. They question the explanation of the transmitted wave advanced by Queirolo, viz., that it is due to the air in the bag being under tension, on the ground that they were unable to get good results when the stomach was previously empty, and hold that the general compression of the bag is the cause of the marked movement, less tension being necessary than if one percussed over a distended stomach communicating with a recorder.

SURGERY.

UNDER THE CHARGE OF

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Spinal Anæsthesia. A Review of the More Recent Literature.—The credit for the discovery of this method of anæsthesia belongs to LEONARD CORNING, of New York, who published the results of his experiments in the *New York Medical Journal*, 1885, vol. xlii., p. 483. He used a solution of cocaine, and his first injection was made between the twelfth dorsal and the first lumbar vertebræ, with complete success. Like MITCHELL (*Injuries of Nerves, and Their Consequences*, Philadelphia, 1872) and THORBURN ("Injuries of the Cauda Equina," *Brain*, vol. x.), he regarded the wounding of the terminal filaments or the nerves of the cauda equina as something to be avoided, and so the injection was made between the membranes and not into the subarachnoid space. Despite Corning's success, this method did not seem to meet with the approval of the profession, for no one else attempted it at this time. Six years later QUINCKE (*Berlin. klin. Wochenschrift*, 1891, No. 38) showed that the cerebro-spinal fluid could be evacuated after lumbar puncture with ease and without danger. His experiments were made in order to decrease the pressure caused by the cerebro-spinal fluid, to obtain some of this fluid for examination and diagnostic purposes in certain conditions, and for the purpose of testing the direct action upon the nerves and cord of certain medicines which could be mixed with this fluid. After that Mosso and FRANCK (*Archives de Physiologie*, 1892, p. 562) showed that the injection of cocaine was followed in six or seven minutes by a complete anæsthesia, which gradually disappeared and was not followed by deleterious effects. SICARD (" Essais d'injections microbiennes, toxiques et thérapeutiques, par voie céphalo rachidienne," *Société de Biologie*, April 30, 1898) injected through a lumbar puncture into the subarachnoid space, in a case of tetanus, 4 c.c. of

antitetanus serum. BIER (*Deutsche Zeitschrift für Chirurgie*, 1899, vol. li., p. 361) applied all of this to surgery in April, 1899, when he made a lumbar puncture, withdrew some of the cerebro-spinal fluid, and then injected a solution of cocaine into the subarachnoid space, and so obtained surgical anæsthesia. He performed six operations in succession by this method, employing a solution varying from 1 : 100 to 1 : 200 in strength, first securing anæsthesia of the skin after Schleich's method. The operations were painless, but the persistence of headache and the condition of malaise caused by the injections induced him temporarily to abandon this method. At this time TUFFIER (*La Presse Médicale*, November 15, 1899) began using this method, using a 1 per cent. solution of cocaine, which caused perfect anæsthesia, but was followed by severe headache. About the same time SELDOWITCH (*Centralblatt für Chirurgie*, 1899, No. 41, p. 1110) reported his experience with this method, and since then many names have been added to the bibliography.

CORNING (*Medical Record*, New York, October 20, 1900) thus describes the technique : The needle may be from three and a half to four inches in length and, preferably, made of either platinum or gold, which will bend, but is not liable to break. There should be a small steel nut transfixed by the needle, sliding freely upon it and fixable at any point in the needle's length by the aid of a small set-screw. When the needle is thrust in and a few drops of cerebro-spinal fluid emerge, this nut is slid down until its lower aspect rests on the skin, when it is firmly fixed in place by tightening the screw, and so effectually prevents the further entrance of the needle into the spinal canal. The syringe should be of glass, graduated up to thirty minims or more, and provided with an asbestos packing, which permits of more thorough sterilization. A short, delicate trocar should be used to penetrate the skin of the back, subsequently passing the needle through the opening of the trocar. The operator should prepare his hands as for any major operation, and the patient's back should also be prepared in the usual manner. The syringe, needle, and trocar should be carefully sterilized as well as the anæsthetic, which should be a 2 per cent. solution of the hydrochlorate of cocaine, but SEGUEN and KENDIRDJY (*La Presse Médicale*, October 27, 1900) report having had equally good results with a hydrochlorate of eucaine solution. At present there seems to be a predilection in favor of making the injection between the spinous processes of the fourth and fifth lumbar vertebræ, although anæsthesia is more quickly induced when the injection is made higher up. After puncturing the skin with a trocar the needle should be slowly introduced through the trocar in a direction from without inward and from below upward. The outflow of a few drops of cerebro-spinal fluid will tell of the penetration of the membranes. The needle may now be attached and injection made of from 10 to 15 minims of a 2 per cent. cocaine solution. The needle should be maintained in place until anæsthesia appears. The phenomena following the injections are paræsthesia, tingling, numbness, and finally disappearance of sensibility to pain in the regions below the point of injection. The time that elapses before anæsthesia is complete is variable, but, as a rule, it is from four to ten minutes, and the duration of the anæsthesia is from an hour to an hour and a half. This method of anæsthesia has been used in a large number of cases, and so

far without a single death due to the anæsthetic. Seguen and Kendirdjy (*supra cit.*) report their results in fifty-seven cases, in all but two of which the anæsthesia was perfect. The first of the two unsuccessful cases was a woman with appendicitis, and the second was a case of bilateral salpingitis, necessitating vaginal hysterectomy. In three other cases vaginal hysterectomy was performed under perfect anæsthesia. TUFFIER (*La Presse Médicale*, November 7, 1900) reports 210 successful cases, 112 of which were intraperitoneal operations. Many others have added to the bibliography of this method; thus KREIS (*Centralblatt für Gynakologie*, July, 1900), DOLERIS ("Anesthesie Obstetricale par injection de cocaïne sous l'arachnoïde lombarie," *Académie de Médecine*, July 17, 1900), and MARX (*New York Medical News*, August 25, 1900) have applied this method to obstetrics. TUFFIER (" De l'anesthésie médullaire par injection de cocaïne sous l'arachnoïde lombaire," *XIII. Congrès Internat. de Médecine*, Paris, 1900) gives a most thorough review of his experience to date. SEVEREAUN and GEROTA (" L'analgésie chirurgicale par les injections de cocaïne dans le canal rachidien," *XIII. Congrès Internat. de Médecine*, Paris, 1900), NICOLETTI (" Recherches expérimentales, histo-pathologiques et cliniques sue l'anesthésie cocaïníque de le moelle épinière par injection sous arachnoïdienne lombaire," *XIII. Congrès Internat. de Médecine*, Paris, 1900), PITESCI ("Anesthesia par injection de cocaïne dans le canal médullaire," *XIII. Congrès Internat. de Médecine*, Paris, 1900), and RACORICEANU (*Contribution à l'Étude de l'Anesthésie Médullaire par le Cocaïne*, Paris, 1900) report cases, and state their belief that the nerves return to the normal and remain so after the injections. BIER (*Münchener med. Wochenschrift*, September 4, 1900), after an experimental and clinical study, insists, with reason, upon the dangers of using large doses of the anæsthetic. More recently POUSSON and CHAVAUNAZ (*Journal de Méd. de Bordeaux*, 1900, vol. xxx.), JONNESCO (*Bull. et Mem. de la Soc. de Chir. de Bucarest*, 1900, vol. ii.), DUMONT (*Correspondenzblatt f. Schweizer Aertze*, 1900, No. 13), BIBOT (*Un Nouveau Procédé d'Anesthésie Chirurgicale*, Paris, 1900), DE RONVILLE (*Nouveau Montpellier Medicale*, 1900), TUFFIER and HALLION (*Société de Biologie*, November 4, 1900), MOORE and STEWART (*Northwestern Lancet*, November 1, 1900), and TAYLOR (*Virginia Medical Semi-Monthly*, October 26, 1900) have reported cases. As a rule, the phenomena following the subarachnoid injection of cocaine are vomiting, headache, and some elevation of temperature. SEGUEN and KENDIRDJY (*supra cit.*) state that in 31 of their 55 cases vomiting was entirely absent. Thirteen of the patients did not vomit during the operation, but did so in from a few minutes to an hour after the completion of the operation. In 11 cases the vomiting came on during the operation, but ceased before it was finished, and did not recur afterward. Headache was a little more frequent, being present in 31 cases. As a rule, it was not severe and lasted until the following morning, and probably helped to produce the insomnia, which often follows this method of anæsthesia. However, in two cases it was very acute, and in another case (that of a woman who had been curetted) it presented the characteristics of a true morcellement during the following thirty-six hours. An elevation of temperature was observed after the operation in 12 of the 55 cases; in one case (that of an abscess following extravasation of urine) it could not be attributable to the injection, but was the result of the patient's

condition.   The other cases comprised : 6 radical cures for inguinal hernia,
2 cases of tubercular epididymitis, 1 case of varicocele, 1 case of fistula in
ano, and 2 cases of curettement.   The temperature in these cases varied be-
tween 38° and 40° C., and by the following morning it came down to normal,
and remained there.   The night after the operation is often a restless one,
often the result of the elevation of temperature and the headache, for when
both of these sequelæ were absent the patients slept well.   Dilatation of the
pupil was observed in a certain number of cases, generally as a phenomenon
premonitory of vomiting and headache, and was the result of a more rapid or
greater action of the cocaine.   In seven cases relaxation of the sphincter ani
was observed ; in one case it occurred during the operation.   Paraplegia has
been feared by some authors as a sequela, but in only one case was it observed
—that of a woman who was curetted and who had slight paralysis of the legs
for three hours, when it disappeared.   Some vesical troubles have followed
this method of anæsthesia.   One case operated on for hydrocele had reten-
tion of urine for eight days, and the symptom then disappeared.   In another
case, that of a woman who was curetted for metritis, incontinence suddenly
developed without being preceded by retention, and lasted for three days.

SEGUEN and KENDIRDJY (loc. cit.) state that this method of producing
anæsthesia has its advantages and its disadvantages.   Among the former are
that it may be used in those patients who are afraid to take chloroform and
who desire to be operated upon without suffering and without loss of con-
sciousness ; but it is also to be remembered that for certain operations this
may be a great inconvenience, such as in the major pelvic and abdominal
operations, in which this method of anæsthesia is distinctly contraindicated.
It is especially contraindicated in the major gynecological operations, for
with this method muscular relaxation cannot be obtained ; vomiting may
come on during the operation, and these distinctly increase the operative
risk in a delicate operation.   But aside from these restrictions the lumbar
anæsthesia is superior to the general anæsthesia ; during the operation the
anæsthesia is absolute ; after the operation the patient is returned to his bed
in a calm frame of mind.   He may eat before and after the operation, and
there is not the sequela of almost constant vomiting which nearly always
follows the use of a general anæsthetic.   Again, nothing is more in favor of
the use of the lumbar anæsthesia than the rapidity with which it is agreed to ;
and the patient is returned to his room conscious and tranquil.   Patients
who have submitted to general anæsthesia and also to the lumbar method
cannot speak too highly of the latter.   On the other hand, spinal anæsthesia
is not destined to replace chloroform, but it does constitute an excellent
method for a certain class of cases.   General anæsthesia is still indicated in
the major gynecological and pelvic operation, preferably in vaginal hysterec-
tomy, in exploratory laparotomies, and in all operations in which muscular
relaxation is essential to operative success ; but, on the contrary, the spinal
anæsthesia is to be preferred in all operations below the umbilicus which
are short in duration and simple of execution, such as operations on the
perineu n, the external genitalia, and the legs in cases where muscular re-
laxation is not a factor in operative success.   In conclusion, it may be said
that although no deaths have so far been reported from this method, it still
remains to be shown that subarachnoid cocainization is safer than general

anæsthesia; in fact, it is very questionable if it is as safe.   The puncture of
the spinal canal itself, not to mention the injection of cocaine, is not without
its danger, as has been shown by GUMPRECHT (*Deutsche med. Wochenschrift*,
1900, vol. xxvi., p. 386), who reports seventeen cases of sudden death fol-
lowing simple lumbar puncture for diagnostic purposes.   Beside this the
involuntary defecation and urination during the operation is not only
embarrassing, but in addition may add greatly to the operative risk by
infecting the field of operation.   Again, it would seem to be a marked dis-
advantage instead of an advantage to have the patient conscious during the
operation.

As Corning (*supra cit.*) has stated, everyone at all conversant with the
serious results inevitably following infection of a serous cavity must be
profoundly impressed with the necessity of a rigid asepsis, and any neglect
of those necessary and elaborate rules of antisepsis so necessary to the safety
of the patient will be followed by most disastrous results.   He clearly em-
phasizes the dangers to the cord from this operation, and it would seem that
sufficient time has not yet elapsed to prove absolutely that this method of
anæsthesia will not be followed by degeneration of the cord and of the
nerves.

Observations on the Surgery of the Gall Tracts.—JONES (*Medical Record*,
October 20, 1900) states that patients with long-standing disease of the gall
tracts are poor subjects for surgical operation, and surgical interference is
attended by considerable risk.   In such cases it would seem to be best to do
first a cholecystostomy—the simplest operation and the one attended by the
least risk—leaving more radical treatment for another time should it become
necessary.   He emphasizes: (1) The diagnostic value of the point of max-
imum tenderness on pressure, which is over the gall-bladder, at or near the
costal margin of the ninth rib.   This point in disease of the gall tracts cor-
responds in importance with McBurney's point in disease of the appendix.
(2) The diagnostic value of the presence of bile in the urine excreted during
or immediately after a very brief obstruction of the common duct.   (3) That
disease of the gall tracts is of very common occurrence, and is liable to be
mistaken for other troubles which it closely imitates, so it is important that
the cases be recognized early.

Clinical Notes on Cases of Gallstones.—CHAPMAN (*Intercolonial Medical
Journal of Australasia*, September 20, 1900) reports three cases.   The first
case was a woman who presented symptoms of pain in the region between
the ensiform cartilage and the umbilicus, vomiting after severe attacks of
pain and on taking solid food, some jaundice, and some fever.   A small,
rounded, movable tumor could be felt above the umbilicus just to the right
of the median line.   Palpation of this tumor caused severe pain.   An ex-
ploratory operation was performed, and on exposing the tumor it was found
to be the gall-bladder, slightly enlarged and containing a stone, which was
removed.   The gall-bladder was sutured to the peritoneum and drained.
The patient made an uninterrupted recovery.   The second case was that of
a woman who complained of indigestion, occasional attacks of vomiting,
jaundice, loss of appetite, and pain on the right side in the epigastric region,

but no tenderness. On palpation a swelling was found in the median line and slightly to the right, transmitting the aortic impulse and apparently superior to the pylorus. There was an irregular temperature, with night-sweats and chills. As the patient was becoming steadily weaker, operation was decided upon, and an incision was made in the median line above the umbilicus. A stone was found in the common duct; it was freely movable, but it was found impossible to move it into the gall-bladder even after in-cising the gall-bladder, so the stone was removed after incising the common duct. The incision in the gall-bladder and in the duct were closed by sutures, and the patient speedily recovered. The third case presented all the characteristic symptoms of empyema of the gall-bladder. The abscess was opened and a half-pint of pus and a small calculus were removed. The wound was closed with drainage, and on the fourteenth day after the operation the patient left the hospital with the wound healed, and has re-mained well.

The Technique of Exploratory Craniotomy.—CODIVILLA (*Revue de Chirur-gie*, November 10, 1900) states that the craniotome which he has devised is so constructed that one is able to elevate large pieces of the cranium in either an oval or a circular form. It divides the soft parts concentrically to the in-cision of the bone, but through a larger circumference than that which is marked on the cranium by the osteotome. The incision made on the bone is nearly linear, and the loss of bony substance is slight. The craniotome may be applied equally well to the hard part of the cranium and to the soft, weak parts. Repair reproduces in the region operated upon the normal anatomical conditions. The craniotome may be operated rapidly and surely and without danger of wounding the skull contents. The instrument is capable of easy transportation and sterilization. It requires no other force than the hand of the surgeon.

The Surgery of the Stomach.—CARLESS (*The Practitioner*, London, Novem-ber, 1900) states, after reviewing the various operations that may be performed on the stomach, that there are quite a number of conditions in which gastro-enterostomy is undertaken simply for the purpose of assisting the stomach to empty itself as rapidly as possible. Thus it may be advisedly recommended under the following circumstances: (1) When a patient with gastric ulcer has been carefully dieted and given every chance to recover, and yet the symptoms persist. (2) It may be utilized in the treatment of hemorrhage, in connection with gastric ulcer, which occurs either as an acute or as a chronic complication. (3) It is probably the best operation in all cases of pyloric stenosis due to gastric ulcer, and possibly the only feasible proceeding when stenosis of that orifice arises from extrinsic causes, such as the contraction of adhesions formed in connection with an inflamed gall-bladder. (4) In pyloric cancer the same limitations are frequently present. The growth early contracts adhesions to surrounding parts, whereby it is rendered hope-lessly irremovable, and care must then be taken that the anastomosis is per-formed through a portion of the gastric wall which is sufficiently healthy. (5) Again, there are not a few cases of atonic dilatation of the stomach which are best treated by gastro-enterostomy, though not until a thorough course

of lavage and medicinal treatment has been undertaken. (6) Once more, in the condition known as hyperchlorhydria or gastric succorrhœa, in which the patient is tormented with acid eructations and heartburn, to say nothing of pain and distention, the rapid emptying of the viscus is most desirable, and in no way can this be better accomplished than by the formation of an artificial opening into the jejunum.

PEDIATRICS.

UNDER THE CHARGE OF

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AND

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The Confusion of Two Diseases under the Name of Rubella.—CLEMENT DUKES (*Lancet*, July 14, 1900, p.89) presents what seems to be conclusive proof that the eruptive disease described under the name of rubella, which has been recognized under two distinct forms—the morbilliform and the scarlatiniform—is really not one, but two different diseases, the one resembling scarlatina so closely being designated by him for the present " the fourth disease," measles, scarlatina, and morbilliform rubella constituting the other three.

He refers to a school epidemic of thirty-one cases of an illness (assumed to be the scarlatiniform variety of rubella, but really the " fourth disease ") which proved to be scarlet fever and the " fourth disease " simultaneously occurring, thus showing the entity of this " fourth disease " as a distinct and definite malady, separable from scarlet fever and even from a modified scarlet fever. In this epidemic some of the patients (32.25 per cent.) apparently passed through the same illness twice over. Mainly guided by the period of incubation, the author was able to decide that some of the boys had scarlet fever only ; that others had the " fourth disease " only ; that one had scarlet fever and subsequently the " fourth disease," and that others had the " fourth disease," followed by scarlet fever.

In another school epidemic of nineteen cases at Rugby the illness resembled scarlet fever more closely than any series of cases hitherto seen by the author, due not only to the marvellous resemblance between the rash and that of scarlet fever, but also to the copious desquamation of the skin which in some instances succeeded. It was clearly, however, an epidemic of the " fourth disease " alone. In this series 42.1 per cent. had already suffered from rose-rash (some within the preceding twelve months).

The symptomatology of the " fourth disease " apparently coincides very closely with that of the ordinary type of rubella, except in the different

appearance of the rash and in the fact that desquamation may be very complete and as free as in the worst cases of scarlet fever. The rash differs from that of rubella in that it does not pass through a stage of morbilliform maculation, but assumes the character of scarlatina from the beginning. Redness and swelling of the fauces are usually present, but are attended with but little discomfort. The cervical lymph glands are somewhat enlarged and tender, but while more pronounced than in scarlatina this enlargement is usually less conspicuous than in rubella. The fact that the disease, as noted in the Rugby epidemic, affects patients that have previously suffered from undoubted rubella is the most convincing point of all.

The points which serve to distinguish the " fourth disease " from scarlatina are its prolonged incubation, nine to twenty-one days ; the usual lack of pre-eruptive vomiting ; the low pulse rate, which rarely reaches 100 ; absence of desquamation of the tongue about the fourth day, and thus failure to observe the strawberry tongue ; the absence of renal complication ; the lack of immunity against a subsequent attack of scarlatina, and the shorter period of infectivity, which is said to be limited to from fourteen to twenty-one days, even though the desquamation may continue for several weeks longer.

[The assertion of so distinguished an observer as Dr. Dukes, that there are good grounds for assuming the existence of a " fourth disease, " is worthy of very respectful attention. That there is a disease so closely resembling scarlet fever as to have been frequently mistaken for it there can be no doubt in the mind of any careful student of the eruptive diseases of childhood. Whether this is generically distinct from the ordinary type of German measles is a question that should not be hastily answered, though the statement that fully 42 per cent. of a series of patients suffering from this disease had previously passed through an undoubted attack of rubella is a most suggestive one. The problem opens up a new field for investigation on the part of observers in institutions in which a large number of children may be carefully studied under similar conditions.—Ed.]

Splenic Anæmia of the Infant.—West (*Medical Press*, August 22, 1900, p. 184), in a short review of the splenic enlargements of children, deals especially with the condition unsatisfactorily described under the name of splenic anæmia. This is an unfortunate term, first, in that it seems to imply or assume what really is not yet proven, that the anæmia in some way depends upon and is caused by the affection of the spleen, and, secondly, because the same term is applied to another entirely clinically different affection affecting adults chiefly and only very rarely children, and, as far as the author knows, not recorded in very young children and infants. The disease under consideration, on the other hand, is not an uncommon one, to which infants are especially liable, though it may continue from infancy through the first two or three years of life.

As seen in infancy, the nature of the case is often clearly indicated by the peculiar anæmia and the enlargement of the abdomen. The complexion has a peculiar waxy, ivory-like color with a tinge of olive-green in it, which is very characteristic. The abdomen is tumid and the enlargement of the spleen is often obvious to the eye. The child is usually not emaciated, and

may be plump, but is very feeble. The blood shows no changes but those of simple anæmia, and there is little or no enlargement of the lymphatic glands. The splenic enlargement is easily recognized ; it may be enormous, so that the organ may extend forward beyond the umbilicus, and downward as far as the anterior superior iliac spine. It moves freely on respiration, is smooth on the surface, and is not tender to palpation.

The cells are greatly reduced in number, but retain their relative proportion to each other. The number of red cells may fall as low as 40 per cent. of the normal ; if below this figure the result is almost invariably fatal. The red cells retain their normal amount of hæmoglobin, though some maintain that this is reduced as in chlorosis. Nucleated red cells and megalocytes are often present in small numbers, but the eosinophiles do not vary. If there is any increase in the number of white cells it affects only the lymphocytes, and this stands in direct relation, it appears, with the fever.

The facts that bear on the relation of the splenic enlargement to syphilis and rickets are summed up as follows : Syphilis is occasionally, and rickets frequently, associated with splenic anæmia, but in neither case is the association constant. Neither of them is the sole cause, and they are probably not causes at all, except perhaps, indirectly, by means of the ill-health to which either leads.

As to the relation between the anæmia and the splenic enlargement, three possible alternatives are suggested : 1. The enlarged spleen may be the cause of the anæmia. 2. The anæmia may be the cause of the enlarged spleen. 3. Both the anæmia and the splenic enlargement may be joint results of some common cause. To the first two there are very strong objections. Hence, if neither be correct, it would seem to follow that the third explanation must be the true one, that both conditions depend upon some common cause. It may be, as is held by some, that any condition of health serious enough to lead to profound anæmia in infancy may be associated with splenic enlargement. If this be the case it ought to follow that when health is restored the splenic enlargement should disappear. This, the author thinks, is too sweeping a view of the subject, and concludes that if there be a common cause we do not as yet know what it is.

A Case of Suppression of Urine Apparently Due to Ascaris Lumbricoides. —VANDER BOGERT (*Archives of Pediatrics*, October, 1900, p. 747) reports the case of a girl, aged five years, admitted to the hospital with a history of not having passed urine for nineteen hours. The child had never been healthy, having always had intestinal troubles and difficulty in micturition. Four days before admission she complained of severe pain in the abdomen, which caused her to lie with the thighs flexed. The bowels moved with difficulty, and the abdomen was tender to pressure. Examination upon admission failed to show any abnormal condition except that the temperature was 101.2° F., the pulse 120, and respirations 48. The bladder was apparently empty, but urine was passed soon after admission. The evening temperature continued to be elevated, and on the eighth day reached 103.4° F. At this time the throat was inflamed and, consequently, a dose of antitoxin was given, since cases of diphtheria had been occurring in the ward. After this the temperature gradually fell to normal, and so remained. In the two

weeks following admission the daily amount of urine never exceeded nine
ounces, and only twice did it reach that amount. On the fifteenth day the
quantity suddenly increased to thirteen ounces, and a round worm, 27 cm.
long, was passed by the bowels. From this time the daily amount of urine
averaged fifteen ounces, with much lost.

Frequent examinations of the urine always gave negative results, and at
no time were symptoms of suppression of urine present. Eggs of the ascaris
lumbricoides were found in the stools on one occasion, two days after passage
of the worm, and four days later eggs of the tricocephalus dispar were also
observed. Treatment with calomel and santonin produced no results.

Researches on the Thymus Gland.—KATZ (*Le Progrès Médical*, June 23,
1900) reports a series of sixty-one observations made at the request of
Bourneville at the Hôpital des Enfants Malades, upon mentally sound chil-
dren dying from various diseases. The age of the subjects varied from one
month to thirteen years, forty-one being under two years of age. The gland
was present in every case, which is of great interest, since Bourneville's
statistics of its presence in imbecile, idiotic, epileptic, and mentally deficient
children showed that no trace of its presence could be found in twenty-five
of his twenty-eight cases. In the majority of cases the gland was reddish-
gray in color, in seven dark red. Thirteen of the cases died of diphtheria,
and in every case the thymus weighed more than the usually assigned aver-
age weight of $1\frac{1}{2}$ to 4 grammes, in one case reaching a weight of 18 grammes.
This increase of weight in cases of diphtheria would seem to be more than
coincidental. Indeed, the variability of weight of the gland in the whole
series was not in accord with the usual statement of authorities. Thus in
20 cases from one to five months old, the weight was 11 grammes : in 25 cases
from five months to two years old, it was 6 grammes ; and in 18 cases over
two years, it was 8 grammes. Bourneville's further studies on mentally
abnormal children have shown the gland to be present in only 27 per cent.
of 292 cases. It thus seems evident that the gland disappears earlier in
abnormal children than in the normal ones.

Typhoid Fever Without Intestinal Lesions in an Infant.—BRYANT
(*British Medical Journal*, 1899, ii. p. 776) reports the youngest instance of this
unusual condition so far reported. The patient was a baby one year and
nine months old, who was brought into the hospital for a persistent diar-
rhœa. The child was greatly emaciated, the abdomen distended and hard,
the spleen enlarged ; there was a focus of bronchopneumonia on the right
lung, the pulse was 136, and the temperature moderately high. On the fol-
lowing day the diarrhœa became more aggravated, and vomiting began,
withsteady loss of strength, and death on the twenty-second day. A Widal
test made on the last day of life gave a strong reaction at the end of two
minutes.

At the autopsy foci of recent bronchopneumonia were found in the lungs,
but the intestines were absolutely healthy, except for marked swelling and
softening of the mesenteric ganglia. Numerous cultures were made from these
hypertrophied glands, and bacilli were obtained which gave both the positive
and negative reactions of Eberth's bacillus.

The author has collected fifteen observations of typhoid fever without intestinal lesions, the age of the subjects varying from that of his own case—one year and nine months—to sixty years. Eleven of the cases presented the general symptoms of typhoid fever. The bacillus was obtained from the spleen in fourteen cases; from the liver in four cases; from the kidney in three cases; from the lung in three cases; from the mesenteric gland in two cases, and from the heart, biliary passages, and cord in one case. The Widal reaction has given positive results in all of the reported cases.

Treatment of Dysenteriform Entero-colitis in Infants.—St. Philippe (*Le Bulletin Médical*, June 6, 1900) states that the glairy dysenteriform variety of entero-colitis is favorably modified by fresh guarana powder, obtained after cold maceration. It should be prepared some time in advance of the time at which it is to be used. The dose varies with the patient's age, from 50 cgm. to 2 gm. in twenty-four hours. The physiological action is complex, but it apparently acts in a substitutive and tonic way.

The Etiological Significance of Hereditary Syphilis in Congenital Heart Lesions.—Moncorvo (*Pediatria*, February, 1900) has recorded his observations of cases of congenital heart affections covering a period of sixteen years. He found that in two cases out of three these infants presented more or less distinct signs of hereditary syphilis, with or without other abnormalities of growth or development. With the majority of observers he agrees in considering rheumatism and tuberculosis of less etiological importance than syphilis. Two cases of congenital heart disease are reported in which a syphilitic history in the parents was obtained. He concludes that syphilis is the principal factor in the production of morbus cæruleus.

THERAPEUTICS.

UNDER THE CHARGE OF

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A Chemical Contribution to Silver-therapy.—Dr. Emil Lange, recognizing the fact that the detection of minute quantities of silver in animal tissues and organs is of importance on account of the ever-increasing use of soluble silver, has carried out some laboratory experiments. He injected into the jugular vein of a rabbit colloidal silver in a solution of egg-albumin, sodium chloride and distilled water to the amount of six and two-tenths

grains of metallic silver. After an interval of nine days the animal was killed, and the only abnormal condition found was a moderately grayish discoloration of the liver, spleen, kidneys, and psoas muscles. The pancreas, skin, small intestine, brain, psoas muscle, skin, liver, heart, lungs, sternum, knee-joint, kidney, stomach, urine, and bile were examined. Chemical analysis, made according to the method detailed, revealed the presence of silver as chloride in the spleen, intestine, heart, lungs, and kidney. Had the treatment been more intensive or prolonged doubtless silver would have been demonstrated to be present in the other organs and tissues.—*Therapeutische Monatshefte,* 1900, No. 8, S. 423.

[These observations settle beyond doubt the innocuousness of soluble silver even given intravenously, and establish the fact of its ready absorption and wide distribution through the organism.—R. W. W.]

The Physiological Action of Senecio Jacobœa.—Dr. J. L. Bunch has made a series of laboratory experiments with groundsel. He concludes that (1) injection of small doses of an alcoholic extract of the entire plant into the circulation of a dog causes a rise of general blood pressure, with constriction of peripheral vessels and of vessels of the intestinal area. This effect is accompanied by a diminution in the magnitude of the contractions of both auricle and ventricle. (2) Large doses cause a corresponding fall of blood pressure, with dilatation of the intestinal vessels and inhibition of the contraction of the intestinal coat. (3) After several injections of small doses, or after one large dose of the alcoholic extract, further injections produce a fall of blood pressure, with slowing of the heart, and this effect is repeated unless a considerable interval is allowed to elapse before any further injection of the drug, which then again causes some rise of blood pressure. (4) The entire plant contains two substances with distinct physiological action, but which have not, as yet, been isolated. (5) Watery extracts of the residue obtained by evaporating the alcoholic solution produce a fall of blood pressure and cardiac inhibition, due to the action of the drug on the nerve terminations in the heart, and not to direct action on the muscular fibres of that organ. (6) The substance which causes the rise of blood pressure is not contained in such watery extracts, or, if present, is so in only small quantities.—*British Medical Journal,* 1900, No. 2065, p. 212.

Amylene-chloral.—Dr. J. Arnold Goldmann states that this substance, otherwise known as dormiol, is a combination of one molecule of chloral with one molecule of amylene hydrate. It occurs as a colorless, oily fluid, of a camphoraceous odor, and of a peculiar, though not unpleasantly pungent, cooling taste. Physiological experiments show that 24 per cent. more chloral was borne in the form of dormiol than when taken as uncombined chloral hydrate. From this it is concluded that the decidedly lesser toxicity of this drug is referable to the gradual occurrence and slow progress of disunion of the preparation. Observations upon twenty-four patients show that it has a prompt and reliable hypnotic action, and also an undeniable sedative effect; that it can be depended upon to manifest its action in relatively small initial doses of six minims; that larger doses, often up to twenty-four or thirty-six minims, employed occasionally in individual cases,

have no pernicious consequences; that compared with other hypnotics it is well borne, and, on account of its slow absorption, more harmless, safer, and of more persistent action; that the desired sleep often sets in within a quarter of an hour without preliminary excitation from the remedy, and continues undiminished for several hours; that it has no cumulative action, and even on long-continued use no tolerance is established; that it agrees well with the patients and is taken without any repugnance; and last, that it has no untoward or harmful by-effects or after-effects.—*Merck's Archives*, 1900, vol. ii., p. 394.

Pyramidon and Antipyrine.—MM. ALBERT ROBIN and G. BARDET, under the heading of an aromatic remedy exciting organic changes, present an interesting comparison of these remedies. Noting the observation of Dujardin-Beaumetz, made in 1889, that amide derivatives present notable antipyretic properties, while the methyl derivatives generally possess marked analgesic action, they believe that these drugs are examples of this law. First, pyramidon increases the proportion of urea to total nitrogen in the urine, while antipyrine diminishes it. In febrile diseases pyramidon regularly increases the coefficient of oxidation in place of diminishing it, and in diabetes it can considerably increase organic changes. For pain this remedy acts well not only in rheumatism but in neuralgias, and for this purpose is superior to antipyrine. In diabetes due to exaggeration of nutritive changes pyramidon can only act unfavorably, increasing the amount of sugar, while the effect of antipyrine is directly the opposite.—*Les Nouveaux Remèdes*, 1900, No. 15, p. 337.

Heroin as an Analgesic.—DRS. SAMUEL HORTON BROWN and ERLE DUNCAN TOMPKINS report on fifty instances of its use—for relief of pain, thirty-four; as a hypnotic, sixteen. In all but seven sleep was produced and pain relieved. The action of the drug began in fifteen minutes from the time of administration in twenty-five; in twenty minutes in eighteen patients. The dose was one-twelfth of a grain of the hydrochlorate in thirty-four, and one-sixth in sixteen cases. In thirty the duration of the action of the drug was four, in thirteen from six to eight hours. Thirty-one administrations were hypodermatic, the remainder by mouth. Vomiting was absent in all but four instances, and as these were made before the patients had fully recovered from the effects of ether, it would be difficult to say which was the cause of the vomiting. Contraction of the pupils and subsequent constipation were absent.—*Therapeutic Gazette*, 1900, No. 8, p. 519.

A New Method of Anæsthesia.—DR. F. C. FLOECKINGER makes use of a 2 per cent. solution of nervanin by the Schleich infiltration method. He presents the following résumé of his experiments: (1) Cocaine has a ten times greater toxic action than nervanin in the same doses. (2) Disturbances of the central nervous system and toxic symptoms did not occur. (3) Nervanin has anti-bacterial properties which are totally absent in cocaine, and which preclude the possibility of infection from the use of nervanin. (4) Analgesia follows more quickly and lasts longer with nervanin than with cocaine. (5) A nervanin habit is an impossibility. (6) The burning sensa-

tion felt after injection is attributable to a too rapid discharge of fluid. (7) The after-pain which always follows the hypodermatic use of cocaine cannot occur with nervanin when properly injected. About half an hour before all large operations a hypodermatic injection of one-eighth or one-fourth of a grain of morphine was made.—*The American Therapist*, 1900, vol. ix. p. 51.

Treatment of Acute Alcoholism by Large Doses of Digitalis.—DR. HENRY P. LOOMIS has employed half-ounce doses of the tincture given every four hours for three days. If the patient became quiet and the delirium disappeared the remedy was stopped before the third dose. If not, another series of three doses six hours apart was ordered. From observation of ten patients he concludes that the indiscriminate use of such doses is fraught with danger. They should be given only to the robust, those in early life, with no complications, and those with violent delirium. If after three doses no narcotic effect is produced the remedy should be stopped. The failures were in the chronic alcoholic subjects, in middle and advanced life, the anæmic, and in those with bad nutrition.—*Journal of the American Medical Association*, 1900, vol. xxxv. p. 337.

A New Treatment for Sciatica.—DOTT. ALEXANDRO GHETTE injects hypodermatically salophen dissolved in a sterilized alkaline solution. Two drachms of this solution should contain fifteen grains of the remedy. The injection is made every second day at the middle of a line drawn from the tuberosity of the ischium to the great trochanter.—*Gazzetta degli Ospedali e delle Cliniche*, 1900, No. 114, p. 1195.

Urotropin.—DR. ZAUDY calls attention to the fact that this remedy is not only curative but prophylactic. An instance of complete paraplegia is cited in which bloody pus in large amounts was discharged from the urethra. No gonococci were found. In an effort to make the patient more comfortable he received seven grains in tablets thrice daily for the forty days preceding his death. After eight days the urine became entirely free from pus. The necropsy showed that although the complications were severe there existed but a slight cystitis and no vestige of pyelonephritis.—*Deutsche medicinische Wochenschrift*, 1900, No. 37, S. 589.

DOTT. CANALI reports that a patient who had suffered for three years from renal colic, whose urine contained albumin, pus, and many small granules of uric acid, received this remedy, and after ten days began to pass small uric acid calculi in the urine. The pains disappeared, and a month later he was cured. This patient apparently suffered from calculous pyelitis. —*Gazzetta degli Ospedali e delle Cliniche*, 1900, No. 99, p. 1040.

The Treatment of Diabetes Insipidus by Amylene Hydrate.—DR. WILHELM NIESSEN reports three instances of the use of this remedy in dose of half a drachm, either at bedtime, or in two doses night and morning. The taste of the remedy is somewhat unpleasant, it often produces burning in the throat, and sometimes eructations. It is best administered in sweetened red wine or a glass of beer.—*Therapeutische Monatshefte*, 1900, Heft 8, S. 422.

[A considerable experience with this remedy indicated that less than a drachm dose was ineffectual, and, further, that patients very rapidly acquire a tolerance for the drug. Its taste soon becomes extremely repugnant to patients.—R. W. W.]

The Treatment of Urethral Blennorrhœa.—DR. MEYERHARDT praises oil of sandal wood, and reports that in thirty-five instances of acute disease cure was reached in from three and one-half to twelve weeks, in some instances longer, two having lasted thirty-three weeks. Sixteen subacute cases were cured in from two and one-half to seven weeks; in three the longest cure took eleven, twelve, and twelve and one-half weeks. Of thirteen chronic cases the necessary time varied from nine and one-half to sixteen weeks; in one it was eighteen, and in one forty weeks.

DR. F. G. MÖHLAN has treated about one hundred and twenty patients suffering from chronic gonorrhœa by massage of the penis from prostate to glans, and irrigation of the bladder and urethra with one or two quarts of lukewarm boiled water. A steel sound which just fills the urethra is passed, and massage in the same direction is repeated. After removal of the sound the urethra is again irrigated. This procedure is repeated every two or three days, and in about three weeks no inflammatory products can be demonstrated by the microscope.—*Therapeutische Monatshefte*, 1900, Heft 8, S. 428.

The Medicinal and Dietetic Treatment of Heart Failure in the Aged. —DR. FORBES ROSS presents some facts in the use of strophanthus as illustrated by cases : (1) Failure, without suitable diet. (2) Success in the same case, with suitable diet, after digitalis had failed to relieve. (3) The need for nerve stimulants with the use of this remedy, particularly in cerebral degenerations. (4) The value of a tonic dietary for the purpose of regenerating the nervous forces. (5) The prolonged tolerance for, and relatively harmless effect of, the lengthened administration of this remedy on the cardiac, nervous, and digestive systems. (6) The adjuvant action of other drugs used at the same time, as mercury, nitrates, alkalies, diffusible stimulants, and nerve tonics. (7) Success or failure of strophanthus is governed by the absence or presence, untreated or unprovided for, of conditions outside the range of the therapeutic action of the drug; the latter is often wrongly judged to be ineffective or harmful. (8) The peculiar actions and symptoms, mainly adverse, produced by strophanthus when administered in combination with a mineral acid.—*The Lancet*, 1900, No. 4016, p. 515.

Intensive Guaiacolization in Pulmonary Tuberculosis.—DRS. A. WEILL and M. S. DIAMANTSBERGER propose the following : (1) Preliminary evacuant injection of a 3 per cent. aqueous solution of boric acid, followed by forty to fifty drops of a solution of equal parts of synthetic crystallized guaiacol and oil of sweet almond in a quarter of a glass of milk. (2) Application of the guaiacol oil solution every day over a space three by four inches on different parts of the chest. (3) A pill every three or four hours constructed as follows : Synthetic guaiacol, one-sixth; crystallized terpen, one-third; benzoic acid, one-half; extract of belladonna and extract of

gelsemium, one sixty-fourth of a grain.   In over five hundred patients this method has yielded good results.   Not only in pulmonary tuberculosis but also in chronic bronchitis with fetid expectoration, in pulmonary gangrene, and in intestinal tuberculosis it is useful.—*Revue de Thérapeutique Médico-Chirurgicale*, 1900, No. 18, p. 622.

Artificial Serum-irrigations in the Treatment of Enteric Fever.—DR. T. BAYLAC, inspired by the good results obtained in 1893 in the treatment of cholera, has extended the use of this method to enteric fever.   Its advantage lies in its simplicity as compared with intravenous or subcutaneous injections, although in desperate conditions the intravenous method may be necessary.   The amount of normal saline solution used is one quart, introduced through an irrigation tube each morning and night at a temperature of 59° F., and retained so long as is possible.—*Revue de Thérapeutique Médico-Chirurgicale*, 1900, No. 16, p. 554.

Normal Salt Solution in the Treatment of Hemorrhage in Typhoid Fever.—DR. C. H. ANDERSEN urges the intravenous injection of a quart of normal salt solution, the reservoir being elevated three feet, and the time required for the injection being twenty minutes.   Five patients received transfusion, one several times for repeated hemorrhages, and all recovered.—*Medicine*, 1900, vol. vi., p. 710.

[The claim that this method is new is hardly tenable in view of the fact that to our knowledge it has been practised for nearly a score of years.—R. W. W.]

OBSTETRICS.

UNDER THE CHARGE OF

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Pitfalls in Diagnosis in Gynæcology.—Under this title MACNAUGHTON JONES (*Edinburgh Medical Journal*, 1900, p. 570) describes a number of cases in which the diagnosis of the condition was very difficult.   Among others he mentions those complicating pregnancy.   Gynecologists have in many cases mistaken the pregnant uterus for a myomatous womb.   He draws attention to the fact that a myoma which bleeds may occasion errors in diagnosis when the uterus endeavors to expel it; such a tumor has been considered a placenta prævia.   He draws attention to mistakes in the diagnosis of ovarian cysts, where pregnancy with polyhydramnios or ectopic gestation has been mistaken for ovarian disease.   Thus a patient was supposed to be in labor when the condition present was an ovarian cyst and beginning peritonitis.

He describes a case in which the patient was forty years of age, her last pregnancy having occurred twelve years previously. Menstruation had been irregular for some time, but had ceased for a few months before the patient was examined. Her general health had suffered, and the abdominal tumor was steadily increasing. Vaginal examination conveyed no impression of pregnancy. Fluctuation and a solid mass in the uterus were found. The patient was prepared for operation, and when anæsthetized the abdomen was again examined and fœtal heart sounds were heard and milk was found in the breasts. The fact that diseased conditions affecting the pelvic organs may undergo considerable change in a short time makes positive diagnosis difficult without repeated examinations. Thus, cystic tumors may rupture, a ureter may become blocked and a temporary hydronephrosis develop, a polypus may retract upon its pedicle within the uterus, while in some cases the polypus may escape a curette during operation.

[It is novel and interesting to hear from a gynecologist that these gentlemen are capable of mistakes. Some of them have so long posed as subsisting largely upon the incompetence and errors of obstetricians that it is a hopeful sign to find a gynecologist recognizing difficulties in diagnosis. We have recently had occasion in consultation to examine very thoroughly several patients in whom the question of pregnancy had to be considered. We know of no more severe test of thorough work in diagnosis than the positive recognition of a complicated pregnancy.—ED.]

Stump Pregnancy.—Under this title MORFIT describes the case of a patient who produced an abortion upon herself (*Medical News*, 1900, p. 869). This was followed by infection, and the tube and ovary upon one side were subsequently found infected and removed by abdominal section. The patient made a good recovery. Two years and four months after this she was again seen and found with the symptoms of shock and collapse from some intra-abdominal complication. She rallied sufficiently to be taken to a hospital, and the abdomen was again opened. When a mass of blood-clots had been turned out it was found that the oozing came from the stump of the old operation. The stump had ruptured and placental tissue presented upon it. Both tubes were entirely removed, and the patient made a complete recovery. She was, however, greatly prostrated, and rallied with great difficulty after the operation. The writer applies the name " stump pregnancy " because the pregnancy evidently occurred at the stump of the former operation.

Vulvar Hæmatoma.—In the *Scottish Medical and Surgical Journal*, 1900, p. 505, BALLANTYNE describes the case of a primipara, illegitimately pregnant, who was in labor. The membranes had ruptured a short time previously. When the second stage began the patient complained of a sharp pain on the left side of the vulva. A tumor shortly afterward began to form in the left labium. When the patient was seen she had lost much blood and was slightly œdematous under the eyes. The left labium was greatly swollen, containing a tumor, bluish-black in color, the size of a closed fist, which seemed almost ready to burst. On vaginal examination the head was found to be well engaged in the pelvic inlet.

The decision to deliver with forceps was reached, and the forceps were applied with considerable difficulty. The head was readily brought to the perineum. At this moment the tumor bulged into the fenestra of one of the blades and ruptured with a clean-cut tear. A huge mass of clot with some fluid blood was at once expelled. The child was immediately delivered; it was asphyxiated, but soon revived. It was not abnormally large, nor was its head abnormally hard and firm. The placenta and membranes were removed manually from the vagina, when it was found that the hemorrhage from the hæmatoma had almost ceased. The parts were carefully washed with bichloride of mercury solution, and the effort made to bring together the edges of the tear. It was found impossible to do so, and the labium was drained by a packing of iodoform gauze. Gauze was also placed in the vagina. The patient made a good recovery without complications.

The case is a typical one of this accident, without, in the present instance, any known cause. By some writers, chronic nephritis is supposed to be associated with the condition, but in the present instance nothing of the sort was present.

[As regards treatment, incision into the hæmatoma is sometimes practised and the blood-clot immediately turned out. This gives the advantage of a clean incision for the application of sutures. Usually, however, it is impossible to close the tissue by sutures, and gauze packing is the method of treatment employed.—ED.]

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The Causation of Tubal Pregnancy.—In the *Archiv für Gynäkologie*, 1900, Band lx., Heft 3, GLITSCH contributes a paper in which he reviews his cases and also the literature of the subject. He concludes that no one factor can be alleged to be the constant cause of ectopic gestation. It must be known that a predisposition is certainly present, greatly influenced and modified by intercurrent affections. Inflammation of the tube and surrounding tissues is present in most of these cases. Other causes in comparison are infrequent. This inflammation results from the action of micro-organisms associated with tubercular, puerperal, or gonorrhœal processes. Of these, gonorrhœa is by far the most frequent cause.

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The Treatment of Full-term Ectopic Gestation.—In the *American Journal of Obstetrics*, 1900, p. 740, CRAGIN discusses the question as to whether an effort should be made to save the life of an ectopic fœtus when viable He urges that the child's life should receive more consideration than it has in the past. He reports three cases, in one of which he delivered a living child, which survived, by abdominal section, and states his belief that by not attempting to remove the placenta at once, but by allowing it to be gradually discharged, it is possible to operate successfully in these cases, and, as this is the case, the life of the fœtus should not be sacrificed in ectopic gestation.

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The Care of the Umbilicus.—RIECK (*Monatsschrift für Geburtshülfe und Gynäkologie*, 1900, Band xi., Heft 5) contributes a paper upon the treatment of the stump of the umbilical cord and the umbilicus. The principles which he strives to carry out are to make the cord as short as possible and to sterilize

it by the application of heat. This he accomplishes by applying a silk liga-
ture close to the umbilicus and tying the cord firmly. This is a secondary
ligature, as the cord is at first tied, as usual, some distance from the umbilicus
when the child is removed from the mother. The stump of cord and umbil-
icus are then surrounded by wet cotton or a moist towel, and the stump of
cord cauterized by the cautery or by a pair of crushing forceps heated in a
gas flame. The cord sometimes burns rapidly, when caution must be taken
that it be not cauterized too suddenly; and at other times the heat acts very
gradually. The silk ligature is cut short and the very small stump remain-
ing dressed with sterile cotton, linen, or gauze. Care is taken that a nurse
or assistant holds the child firmly, so that it is not burned in any other
portion of the body. The dressing is changed daily unless it adheres to
the stump. It is then allowed to remain until the whole comes away. The
umbilical dressing and bandage are usually not required after the tenth day.

[While this method might be applicable in hospitals, it would scarcely be
employed in private houses. Among the many more simple ways of treating
the cord, the use of alcohol upon sterile gauze has given us good results. The
cord is first crushed and its Wharton's jelly as thoroughly expressed as pos-
sible. It is tied a short distance from the umbilicus and the stump wrapped
in sterile gauze which has been thoroughly soaked in alcohol. It dries rap-
idly under this method and the umbilicus heals promptly.—ED.]

GYNECOLOGY.

UNDER THE CHARGE OF

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Ill Results Following Alexander's Operation.—MURATOW (*St. Peters-
burg med. Wochenschrift*, 1900, No. 5) reports five cases in which shortening
of the round ligaments was followed by complications. Two patients who
became pregnant aborted in consequence of the fact that the ligaments were
so shortened that the uterus could not rise into the abdominal cavity; one
patient died from septic infection. In two instances the ovaries were impris-
oned between the uterus and the anterior abdominal wall. The writer does
not deny the great value of the operation, but thinks that greater care
should be observed in the choice of cases, especially in young women.

Calcium Carbide in Inoperable Carcinoma.—GRUSDEW (*Münchener med.
Wochenschrift*, 1900, No. 24) speaks highly of calcium carbide, which he regards
as the best application in cases of inoperable cancer of the cervix, especially
those in which hemorrhage is the most prominent symptom. Although
pain was considerably relieved, he did not obtain such marked beneficial re-
sults as were reported by other writers. As a deodorizer its effects rarely
persisted beyond a week, when a second application was necessary. The

only unpleasant results which he observed were those due to caustic action
of the lime on the vaginal walls and vulva, and these could be prevented by
introducing pledgets of cotton-wool.

He recommends that the carbide be used previous to curetting and cau-
terizing the diseased tissue.

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Origin of Unilocular Ovarian Cysts.—Von Kahlden (*Ziegler's Beitrage
z. path. Anat.*, Bd. xxvii., Heft. 1) takes a new view of so-called hydrops
folliculi, believing that the unilocular cysts usually regarded as simple re-
tention follicular cysts really develop from included perineal epithelium.
He thinks that the ova often found in these cysts represent both the product
of degenerated epithelial cells and new cell-growths which spring from the
lining membrane.

The question as to whether papillary cysts develop from ingrowths of
ciliated epithelia he regards as still undecided.

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Origin of Dermoid Cysts.—Arnsperger (*Virchow's Archiv.*, Band clvi.)
reports three cases which he believes confirm Wilms' theory that dermoids
of the ovary develop from the three embryonic layers.

Emmanuel (*Zeitschrift für Geb. u. Gynäkologie*, Band xlii.), from micro-
scopical studies of a minute dermoid found in the centre of a small cyst of
the ovary, arrived at the conclusion that it developed from an ovum, which
was borne out by the fact that it contained cell elements from the three
layers.

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Conservative Treatment of Uterine Fibroids.—Olshausen (*Zeitschrift
für Geb. u. Gynäkologie*, Band xliii., Heft 1), in reporting a case in which he
enucleated a fibromyoma of the cervix, comments on the infrequency of
conservative as compared with radical operations for this condition. He
limits enucleation of multiple tumors to cases in which, if small growths
must be left, the patient is so near the climacteric that there is no danger of
their growing. He regards the danger as small, provided that the bed of
the tumor is carefully sutured with tiers of catgut. Fourteen per cent. of
his operations for myoma (207 in all) have been enucleations, with only one
death.

Commenting on the diverse views regarding the necessity of operating
upon uterine fibroids, the percentage of cases selected for operation varying
from 14 to 41 per cent., according to the ideas held by different surgeons,
the writer states that out of 30 cases in private practice seen during the last
three years he had operated upon only 53, or 16.4 per cent., six other
patients refusing operation. In his opinion, one who operates upon a larger
proportion of his cases than this must underestimate the dangers of the
operation, some of which—especially embolism and intestinal obstruction—
are unavoidable.

[This conservative attitude assumed by such a prominent abdominal sur-
geon, whose clinical material is enormous in comparison with that of the
ordinary operator, is in striking contrast to the radical views expressed by
so many lesser authorities. Judging from many of our society discussions,
one would infer that in this country the percentage of fibroids selected for

operation was often as high as 50 or 75 per cent. Indeed, we have heard it positively affirmed that every fibromyoma of the uterus which could be recognized at the examining table was to be regarded as practically an indication for operation. In spite of the improved statistics of hysteromyomectomy, we would do well to heed the warning that there will always be unavoidable deaths after the operation.—ED.]

Ultimate Results of Myoma Operations.—BURCKHARD (*Zeitschrift für Geb. u. Gynäkologie*, Band xliii., Heft 1) concludes an extended article on this subject as follows : The operator need not be deterred from leaving the cervix by any fear of its subsequent malignant degeneration.

With few exceptions the ultimate results are good, such psychical disturbances as follow being transient. After entire removal of the ovaries hemorrhage ceases, and the tumor ceases to grow ; it usually diminishes.

Menstrual molimina are rarely noted after the removal of both ovaries ; when one or both is left after extirpation of the uterus these may occur.

In short, since the patient's health is not injured, but, on the contrary, the usual nervous disturbances are sensibly diminished by leaving the healthy ovaries after removing the uterus, the writer believes that this should be done whenever it is possible.

Epithelial Ingrowths in the Myometrium.—MEYER (*Zeitschrift für Geb. u. Gynäkologie*, Band xliii., Heft 1) describes the microscopical appearances in sections made through seven uteri, which were extirpated on account of obstinate hemorrhages, which had not been relieved by frequent curettement and cauterization. In five nothing abnormal was noted to account for the bleeding except glandular processes which dipped down into the submucous muscular layer. The direct cause of the hemorrhages was inferred to be certain degenerative changes in the bloodvessels, which were more or less constant. The writer believes that the cell-processes were the result of local irritation, and that the hypertrophy of the muscle in this vicinity was sufficient to cause a marked increase in the blood-pressure.

If this supposition is correct, total extirpation is the only cure for such hemorrhage, and is fully justified in view of the tendency of these benign glandular in-growths to become malignant. The curette, however vigorously used, does not reach the seat of the trouble.

The positive diagnosis of this condition is seldom possible clinically, but it should be suspected when no improvement is noted after repeated curettings, while the microscope shows no evidence of malignant disease. On the contrary, it should not be forgotten that the hemorrhage may be due to a small polypus at the fundus or at the cornua.

[This paper is exceedingly suggestive in that it throws new light upon a class of cases which often cause the surgeon great anxiety, lest he may, on the one hand, advise a radical operation for a condition in which it is not justified, or, on the other hand, may counsel delay in a case of incipient carcinoma when early intervention is important. Doubtless the most conservative will agree with the writer, that the persistence of hemorrhage after repeated curetting, especially in a woman above forty years of age, amply justifies total extirpation.—ED.]

Kraurosis Vulvæ.—HELLER (*Zeitschrift für Geb. u. Gynäkologie*, Band xliii., Heft 1) concludes his study of a case by expressing the opinion that kraurosis is a chronic inflammatory process, in which no disease of the nerves can be demonstrated. It may be caused by irritants, especially chemical. Anatomically it is marked by disappearance of the fat and sebaceous glands in the deeper layers of the skin, while in the superficial layers hypertrophy of the tissues is noted, probably in consequence of the better nourishment of the subpapillary and suprapapillary cells.

DERMATOLOGY.

UNDER THE CHARGE OF

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The Parasitic Nature of Eczema.—SCHOLTZ and RAAB (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 4), in a bacteriological study of sixty cases of eczema representing the principal stages of the affection, found the staphylococcus pyogenes aureus almost constantly present. This micro-organism was not only found in the serum of moist eczemas and in the scales of the squamous forms, but had penetrated the tissues.

KREIBICH (*Ibid.*, 1900, No. 5) concludes from his researches that idiopathic, papulo-vesicular eczema, such as has been defined by Hebra, as well as the acute exacerbations in chronic eczema, appear independently of all microbic intervention. Nevertheless, after a longer or shorter time, the vesicles are invaded by pyogenic micro-organisms which provoke a rapid diapedesis, and transform the serous vesicles into pustules. Attempts to produce acute eczema either by the inoculation of serum from oozing eczematous surfaces, or of cultures of the microbes met with in suppurating vesicles, were unsuccessful.

VEILLON (*Ibid.*, 1900, No. 6) concludes that the existence of a specific parasite of eczema is not yet demonstrated. The pure, primitive lesions of true eczema do not contain any microbe discoverable by any of the present methods known to bacteriology. The various microbes, in particular the staphylococcus, which grow abundantly in the open vesicles or on the oozing or crusted surface of eczema, are secondary infections whose direct rôle is not yet elucidated, but which are the cause of most of the complications of eczema, such as furuncle, abscess, folliculitis, etc.

The Visceral Lesions of the Erythema Group.—OSLER (*British Journal of Dermatology*, July, 1900) adds to the series of cases published in 1895 a new series of seven cases of various forms of the erythemata accompanied by visceral lesions, preceded by the subsequent history of one of the cases of the

first series. The visceral manifestations accompanying the cutaneous eruption consisted of: (*a*) Gastro-intestinal crises characterized by colic, colic and diarrhœa with vomiting, hæmatemesis, or bloody stools ; (*b*) hæmaturia and nephritis, six cases out of eighteen ; (*c*) hemorrhages from the bowels, the nose, the gums, the stomach, and the kidneys (not associated with nephritis); (*d*) cerebral symptoms pointing to involvement of the brain ; (*e*) and lastly, pulmonary symptoms. The skin lesions were purpura, urticaria, either alone or associated with purpura, acute circumscribed œdema, and typical erythema multiforme. The inconstancy of the character of the skin lesions was a prominent feature. In more than half the cases swelling of the joints, of the synovial sheaths, or of the periarticular tissues occurred. The author believes that a close affinity between exudative erythema, Henoch's purpura, peliosis rheumatica, urticaria, and angio-neurotic œdema, is shown by the similarity of conditions under which they occur ; by the identity of the visceral manifestations, and by the substitution of these affections for each other in the same patient at different times. The cases reported are difficult to group etiologically. In some a relationship with migraine was suggested. In one case the cause was probably to be found in the products of gastric fermentation taking place in a dilated stomach. Some of the cases were probably of rheumatic origin, although the presence of arthritis does not necessarily indicate the presence of the rheumatic poison.

The Transmissibility of Animal Scabies to Man.—ALEXANDER (*Archiv für Dermatologie und Syphilis*, Bd. lii., Heft 2) reports three cases of scabies, two in children and one in a woman, contracted through contact with domestic animals ; and concludes, from an examination of the literature of the subject and his own experience, that the itch of domestic animals—and of wild animals also when these come in contact with man—so far as it is produced by a sarcoptes, is transmissible to man. It usually runs a mild course, lasting not more than six to eight weeks, and is readily influenced by antiparasitic remedies. In the clinical picture of the disease it is worthy of remark that the localities affected by preference in human scabies are usually exempt, while, on the other hand, the eruption does not show predilection for any particular region. Typical burrows, are, as a rule, wanting, and the demonstration of the mite is difficult.

Psoriasis Vulgaris in the Infant.—J. H. RILLE (*Journ. des Mal. Cut. et Syph.*, July, 1899) reports a case in which this disease occurred in an infant five days old, and calls attention to the fact that psoriasis in children often follows one or another of the acute eruptive fevers, and also vaccination. Cases in which the disease occurred early in life have been reported by Billard (three months), Zeissl (eight months), and Neumann (four months).

Molluscum Contagiosum of the Sole of the Foot.—BALZER and ALQUIER (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 4) recently reported the following case to the Société Française de Dermatologie et de Syphiligraphie : A boy, fifteen years of age, had had a small tumor on the sole of the foot for seven or eight months which gave him much pain in walking, and which continued to increase in size slowly, notwithstanding various forms

of treatment, including two curettings. The tumor was somewhat papillomatous in appearance, of firm consistence, and painful on pressure. As it continued to grow, and all other forms of treatment had failed, it was excised. Microscopical examination of the excised tumor revealed the structure of molluscum contagiosum. No other tumors were found upon the body.

The Treatment of Epithelioma of the Skin with Concentrated Light.— FINSEN (*Dermatologische Zeitschrift*, Bd. vii., Heft 3) at a recent séance of the Danish Dermatological Society reported the results obtained in the treatment of epithelioma with concentrated light. In three out of sixteen cases the treatment appeared to be without result; in four improvement took place, but no cure ; in the remaining nine there was an apparent cure, one of these having been under observation two and a quarter years. In these cases the treatment proved itself so entirely favorable and active as to justify the assumption that repeated treatment can eventually produce an actual cure. The light treatment is only adapted to those cases in which the lesion is superficial and well-limited, and situated so as to be easily accessible.

Local Applications of Guaiacol in Lupus.—LEPLAT (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 6) at a séance of the Anatomo-clinical Society of Lille reported two cases of lupus of the face accompanied by extensive ulceration, treated by curettement and painting twice daily with a solution of guaiacol in glycerin, equal parts In the first case the lesions were completely healed in the space of one month, in the second in four months. After some months there had been no recurrence.

Naftalan in Diseases of the Skin.—HALLOPEAU (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 5), who has been experimenting with this substance in his service, finds that it is devoid of irritating properties, and may, consequently, be employed in acute cases. It exerts a remarkable influence upon pruritus ; and in the seborrhœic eczemas of children it produces a more rapid improvement than other forms of treatment. In the eczema of adults its use has likewise been followed by very favorable effects. In a case of the prurigo of Hebra naftalan gave remarkable results, producing almost instantly cessation of the itching and disappearance of the eruption. In a few cases, on the other hand, the results were not so favorable.

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THE SURGICAL TREATMENT OF ASCITES DUE TO CIRRHOSIS OF THE LIVER, WITH REPORT OF TWO CASES.*

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AND

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The two cases herewith reported are placed on record because of the fact that they are illustrations of a very common condition treated by a method which may be said to be still on trial. This method of treatment has not been employed with sufficient frequency up to the present time to permit of an accurate estimate as to its value. While in neither of these cases was the result such as was hoped for, it is felt that this is one reason why they should be recorded, inasmuch as it is personally known to us that in other instances cases having an unfavorable result have not been placed on record, and that consequently a just estimate of the advisability of the procedure cannot be made. From a medical point of view these two cases illustrate a common experience in regard to cirrhosis of the liver as it is seen in hospital work—that is to say, cirrhosis of the liver in a late stage, with frequently recurring ascites, whose only help lies in repeated tappings of the peritoneal cavity.

Case I.—Henry S., white, aged sixty-three years, an engineer by occupation, an Englishman by birth, was admitted to the Pennsylvania Hospital on August 6, 1900.

The family history showed nothing of importance. He had always been a healthy man, never having had any sickness except an attack of gonorrhœa, which was followed by stricture. He has always been a heavy, constant drinker, taking in winter about six or eight drinks of whiskey daily ; in summer ten or twelve glasses of beer daily, and occa-

* Read before the College of Physicians of Philadelphia, January 2, 1901.

above. After his admission to the medical ward he failed to gain very materially, and quite steadily lost ground. Increasing asthenia with cardiac weakness, which progressed in spite of stimulation, led up to his death from heart failure and pulmonary œdema on December 5th.

At the autopsy, which was performed by Dr. Meigs, at that time on duty in the ward, and by him kindly reported to us, the following conditions were noted :

The abdomen was distended and flabby ; the examination was limited to an abdominal incision six inches in length. A certain amount of yellowish fluid slightly tinged with blood was present in the abdominal cavity. The abdominal contents were adherent above and below the umbilicus, and toward the left side to the parietal peritoneum.

The anterior surface of the liver was adherent to the abdominal wall by firm adhesions. The omentum lay above the umbilicus and was adherent to the liver. Universal adhesions were found between the diaphragm and the liver, the adhesions being firmer on this surface than anteriorly and inferiorly. The spleen was very large and weighed twenty-one ounces, about three and one-half times its natural size ; its capsule was much thickened, its surface rough and uneven after detachment from the parietes. On section the pulp was found to be soft, with some increase in the fibrous trabeculæ. The kidneys were normal in size, but on section showed a proportional reduction in the cortex. The liver was small, weighing but two pounds and two ounces. The hepatic

substance was torn anteriorly and superiorly where adhesions had been present. The surface of the organ was but slightly uneven in feeling and in color; the right lobe was very much more contracted than the left. On section the parenchyma did not grit under the knife, but there was evident increase of fibrous tissue, with some fatty change. In the portal vein there was found a softened clot occluding the lumen by about one-third of its diameter. The umbilical vein was found to be patulous. The heart was of about normal size, but weighed eleven ounces. Marked dilatation of the arch of the aorta at its commencement, with many calcareous plates, was found. The aortic and mitral valve leaflets were thickened. The apices of both lungs were dark and nodular, and both organs were intensely congested and œdematous.

CASE II.—An ex-policeman, James P., aged fifty-two years, was admitted to the Pennsylvania Hospital on September 7, 1900. His father died from cause unknown to the patient; his mother died of " dropsy," as did also one sister. Three brothers and three sisters were living and well. Ten or twelve years ago he began passing blood from the bowel, and occasionally has done so ever since that time. These hemorrhages became troublesome two or three months before his admission. He gave a distinct history of syphilitic infection and confessed to the abuse of alcohol. Four or five weeks before his admission his legs began to swell, and shortly thereafter increase in the size of the abdomen was noted. The latter had been progressing steadily since then. On examination there were found slight cyanosis of the finger-tips, tortuous temporal arteries, and dilated venous radicles of the cheeks and nose. Anteriorly pulmonary resonance was normal, but when in the recumbent position the note became flat over the region posterior to the anterior axillary region on the right side. This dulness was found to shift with change of position, and over it there was constantly absence of breath-sounds, with diminished vocal resonance and fremitus; otherwise the lungs showed nothing abnormal. The apex-beat was in the normal position, and the cardiac dulness began at the lower border of the third rib and the left parasternal line. No abnormal sounds were heard except for a very faint systolic murmur at the aortic area, which was not transmitted. The abdomen was tremendously distended, and there was found an easily reducible umbilical hernia of the size of a small apple. Two inches above the umbilicus the circumference of the abdomen was forty-four inches. The flanks were perfectly flat, as was most of the surface of the abdomen except for a clear, tympanitic area surrounding the umbilicus. Fluctuation-wave was easily detected. In addition to his umbilical hernia he had a large, left-sided scrotal rupture. The legs were œdematous and their veins somewhat distended. The urine had a specific gravity of 1027, was acid, contained no albumin, sugar, or casts. Three days after his admission six ounces of blood were passed from the rectum, and on the following day he had a slight epistaxis. On September 11th the abdomen was tapped and 346 ounces of clear yellow fluid were withdrawn. The tapping gave a great deal of relief, the abdomen being found to measure five inches less in circumference as compared with the previous measurement. After removal of the fluid liver dulness was found to begin at the upper border of the sixth rib and to extend downward to the costal margin. On " jogging-palpation " a mass was felt in the upper zone of the abdomen, extending transversely from the ninth costal margin of the right

side to the median line about two or three inches below the left costal margin. Four days after the tapping (September 15th) movable dulness was again detected in the flanks, which in two days had increased and distention of the abdomen was becoming manifest. In spite of various plans of treatment the fluid accumulated to such an extent that it was thought that this patient also was a proper subject for operative inter-ference. Consequently the patient was transferred to the surgical ward.

October 13*th.* Ether narcosis. The same surgical procedures were followed as detailed in the last case. The liver was enlarged, hard, and nodular, with a thick, rounded edge. Peritoneum also congested, but not thickened. Spleen not enlarged, so its surface was not irritated. Three hundred and twenty ounces of ascitic fluid recovered. Slight shock following operation, but reaction good. Tube drained about a pint in the first twenty-four hours.

15*th.* Tube draining less than a pint. General condition good.

16*th.* Slight delirium during night ; tried several times to get out of bed ; no rise of temperature ; mental confusion present this morning and conversation at times incoherent ; urine lessened in amount.

17*th.* Very active and noisy delirium during night, followed by stupor at 2 A.M., which rapidly deepened into coma. Urine very scanty, containing much albumin and casts. Despite free purgation, sweating, and treatment directed toward stimulating urinary secretion, our efforts were unavailing, and the patient died at 10 P.M. No signs of infection were at any time demonstrable, and the cause of death appeared to be uræmia. Post-mortem examination was refused.

A glance at the urine records made while he was in the medical ward shows that there was no albuminuria and no casts in the sediment, and that the urine had a high specific gravity. It is to be noted, however, that the quantity of urine passed in twenty-four hours prior to his admission to the surgical ward never exceeded thirty-four ounces. At the time these observations were made it was thought that the diminu-tion in the quantity of urine was accounted for partly by the frequent occurrence of watery bowel movements, partly by the rapid accumu-lation of fluid in the peritoneal cavity, and partly, also, by his diet, which was somewhat limited in the hope of causing absorption of the ascites. Owing to the absence of autopsy it is, of course, impossible to state the condition of his kidneys, yet from the evidence afforded by chemical and microscopical examination it would have been supposed that his kidneys would have stood the strain of an operation involving so little as did this one.

From the account of the surgical treatment it will be seen that in both cases it was found at operation that the condition suspected before opening the abdomen was present—that is to say, the absence of ad-hesions and of any evident attempt on the part of nature to obviate the effects of portal obstruction. In the patient who died shortly after opera-tion it was unfortunate that no autopsy could be performed, so that the anatomical results of the operation must still remain in doubt. In the second case the autopsy, performed sixty-one days after the operation,

shows that the results aimed at (the formation of adhesions and the establishment of a collateral circulation) were quite well obtained. What effect the operation may have had in this case in lengthening or shortening life it is difficult to estimate, as the patient was losing ground before operation, and the very nature of the case would not allow of any estimate in regard to the probable course had no interference been attempted. He died, as do other cases of advanced cirrhosis of the liver, with evidence of a progressive toxæmia and gradual failure of all the organs to do their proper work.

Doubtless one of the ways by which repeated tappings may aid in the recovery of cases of cirrhosis of the liver is through the formation of adhesions similar to those aimed at in the operative procedure, but to a less degree. The occurrence of ascites in cirrhosis of the liver is undoubtedly a bad prognostic omen. It is, in the first place, a visible measure of the extent of portal obstruction, and, in the second place, it is an indication of a lack of a sufficient attempt on the part of nature to compensate for this obstruction by the establishment of a collateral circulation. The frequent occurrence of cirrhosis of the liver without ascites is well known. Lange (*Inaugural Dissertation*, Kiel, 1888) found ascites present in 34.4 per cent. among fifty-six cases of cirrhosis of the liver of varying degree. Presumably it was absent in the other 65.6 per cent. of the cases. While there are no figures at hand which go to prove it, it is reasonable to believe that in some cases ascites fails to occur because of the establishment of a collateral circulation between the portal and systemic venous systems. While in all cases of cirrhosis of the liver the exact part played by this lesion must be in doubt because of the wide-spread changes present in other vital organs, and probably in all of the tissues of the body, it is reasonable to infer that one of the chief factors in producing a fatal result is progressive toxæmia due to the failure of the liver to destroy toxins absorbed from the portal area. This toxæmia from absence of antitoxic action of the liver is probably present in cases both with and without the formation of a collateral circulation, the only difference between the two classes being that in the former case toxins normally carried by the portal blood would be thrown in large amount into the systemic venous system through the collateral branches directly communicating with the portal supply; whereas in the latter case these toxins would presumably, in part at least, be contained in the ascitic fluid and be removed by tapping.

One of the most exhaustive articles upon ascites and its prognostic value is that by W. Hale White (*Guy's Hospital Reports*, 1893, vol. xlix., p. 1). Some points are brought out in this paper which deserve notice in connection with our subject. Of fourteen cases in which tapping was necessary because of ascites, sufficient data to accurately determine the interval elapsing between the occurrence of ascites and death

were found in twelve. This period averaged only sixty-three days.
The author makes the additional statement that he has not been able to
find a single case among those which he has collected in which any end
but a speedy death could be anticipated after ascites had once developed.
In ten cases in which paracentesis was not performed the time from the
beginning of the enlargement of the abdomen up to death averaged
about two months. He considers that paracentesis is of doubtful value
in alcoholic cirrhosis of the liver, as he found that in fourteen cases the
patient survived the first and only tapping from but two, at the least,
to about forty days at the outside. He considers that where ascites is
survived for any great length of time some condition other than
cirrhosis, or in addition to cirrhosis, is present, or, in other words, that
the ascites is not in this case due simply to cirrhosis of the liver. As an
instance of this he notes ten cases regarded during life as cirrhosis of
the liver, but which were found after death to have some additional
lesion which he believes may have had an important bearing upon
the occurrence of ascites. All of these except one were instances of
chronic peritonitis or perihepatitis. The only exception was a case
of colloid cancer of the peritoneum. Among four cases which he
relates where tapping had been performed more than once, cirrhosis
was absent in three and present, to a slight extent, in one. In all
four there was chronic peritonitis, and among six other cases which
were tapped more than once there was cirrhosis of the liver with
associated chronic perihepatitis and peritonitis. It would seem, then,
from these cases related by Hale White, that the presence of a
chronic peritonitis and perihepatitis with cirrhosis of the liver has a
favorable rather than an unfavorable bearing upon the prognosis, inas-
much as these cases with peritoneal adhesions and thickenings live for
a sufficiently long time to make repeated tappings necessary ; whereas
in cirrhosis of the liver uncomplicated by these inflammatory lesions
death occurred either before tapping had been required or before a
second removal could be practised. It is possible that the longer life,
after the appearance of ascites in Hale White's six cases of cirrhosis of
the liver with chronic peritonitis and perihepatitis, was due not to the
fact that the ascites was produced by the chronic peritonitis and peri-
hepatitis, but because the effects of cirrhosis of the liver as regards the
portal system were obviated by the formation of peritoneal adhesions
somewhat similar to those aimed at in Talma's operation.

An interesting case somewhat bearing upon this question was reported
by R. L. MacDonald (*Medical News*, October 12, 1889, p. 398). This
case was apparently cured, after sixty tappings, with the removal of an
aggregate of 9000 ounces. After an interval of four years from the
last tapping the patient was still in good health. In the same paper
he records a second patient wherein cure resulted, although at one time

it was necessary to remove the ascitic fluid once every three weeks. Altogether thirty-one aspirations were performed, by which from 8600 to 9000 ounces had been removed.   At the time when he was last seen, about a year after first coming under observation and six months after the last tapping, the fluid had not reaccumulated.   Owing to the fact that both patients recovered it is impossible to say to what the cure must be attributed ; possibly compensatory dilatation of the systemic venous trunks obviated the results of portal obstruction, but it is impossible to say whether the repeated tappings had anything to do with this formation of a collateral circulation.

Quincke (*Nothnagel's spec. Path. u. Therap.*, Band xviii., Theil 1) refers briefly to a case reported by Casati where ascites disappeared after 111 punctures.   Quincke states that the relief from the establishment of a collateral circulation can rarely become sufficient to cause the disappearance of ascites.   He gives the average duration of life after the establishment of cirrhosis at ten years.   He states, however, that he does not believe the establishment of a collateral circulation can contribute much to the relief of an obstructive ascites, but that when an outspoken ascites disappears it is because chronic peritonitis has had a part in its production.   Possibly the same remark might hold good here as was made in regard to Hale White's observations, namely, that in the cases of cirrhosis of the liver with chronic peritonitis the survival for a considerable length of time was due to the fact that the latter lesion assists in some way in the formation of a collateral circulation.

History and Theory of the Operation.   To Talma, of Utrecht, belongs the credit of first suggesting the operative formation of adhesions between the abdominal organs and the parietes for the cure of ascites due to cirrhosis of the liver.   As a result of this suggestion three operations were performed in Holland ; the first, in 1889, by Van der Meule, the patient speedily dying from shock ; the second by Schelkly, in 1891, in which the patient on the fourteenth day, during violent delirium, tore off his dressing and infected the wound ; death from peritonitis speedily followed.   The third by Thomas Lens, in 1892.   This case survived the operation, but died in six months without diminution in the ascites.   The failure of improvement was attributed to the smallness and atrophic condition of the liver.   Such poor results seem to have had their effect on Continental surgeons, for no further operations were undertaken for four years.

In the meantime Drummond and Morison independently conceived the same idea as Talma, and in 1894 and 1895 Morison operated on two cases in England.   In the first patient the diagnosis is in doubt, as the liver at the time of operation showed no evidence of cirrhosis. The patient died nineteen months after operation without any diminution in the ascites.   In the second case the liver was typically cirrhotic,

the ascites disappeared, and the patient was well two years later.   To Drummond and Morison must be given the credit of being the first to bring the operation to a successful issue, and by their success to have brought the procedure prominently before the medical world.

The operation was designed on the theory that ascites in cirrhosis of the liver is due to obstructed portal circulation—*i. e.*, to the increased pressure in the portal vein.   If, therefore, some of the portal blood could be made to go directly into the systemic circulation without passing through the liver, the pressure in the portal vein would be relieved and the ascites would disappear.   Several cases of cirrhosis of the liver (such as those mentioned above) have been reported in which after repeated tappings the ascites has permanently disappeared, and in one case the patient lived twenty years, death resulting then from causes unconnected with the liver.   Post-mortem examination of several cases of cirrhosis of the liver where ascites was absent seemed to show one of two things : either that the viscera were connected to the parietes by vascular adhesions, or that the normal communications between the portal and systemic veins were greatly increased in capacity.   These normal communications are : a vein in the round ligament of the liver connecting the left branch of the portal with the epigastric and other veins in the abdominal wall ; veins in the subperitoneal tissue lying between the folds of the hepatic ligaments connecting the portal trunk with the phrenic vein and vena azygos major ; the coronary veins communicating with both the azygos veins through the œsophageal plexus ; the inferior mesenteric vein communicating with the iliac by means of the middle and inferior hemorrhoidal plexuses.   The pancreatic veins can also empty into the retroperitoneal veins.

Talma has lately reported three cases in which a natural collateral circulation was evident.   All were subjects of cirrhosis of the liver, and at one time ascites had been present, but had disappeared before death. One died of acute bronchitis, the second from a stab wound of the abdomen, and the third from toxæmia due to a progression of the disease.   At the autopsies an abundant collateral circulation through enlargement of natural channels was easily demonstrable.   In one case the vein of the round ligament of the liver was as large as a finger.

An enlargement of this collateral circulation may sometimes be seen during life in the superficial veins running through the abdominal wall, and occasionally by the formation of a " caput medusæ " at the umbilicus.   When these communicating veins enlarge a very considerable amount of blood may be thrown directly from the portal into the systemic circulation without passing through the liver.   If these veins do not enlarge, or increase so little in size as to afford little or no relief to the portal congestion, new channels may be formed by adhesions between the viscera and the abdominal parietes.   Such adhesions will

develop innumerable little vessels, which will enlarge and carry a considerable amount of blood, if they are needed in the economy. We have all seen repeatedly the enormous veins that will form in the omentum when it becomes adherent to large tumors of the uterus or ovary, and the free communication these vessels have with the new growth.

Drummond and Morison therefore reasoned that if the mechanical theory of ascites in cirrhosis of the liver is correct, the establishment of a new accessory circulation between the portal and systemic systems would cure the ascites, and so remove one of the chief causes of suffering and death in this disease.

There are, however, some who object to the mechanical assumption of the ascites on the ground that it does not occur when the blood-pressure is presumably highest in the portal vein—*i. e.*, early in the course of the disease, when hemorrhages from the stomach and bowels are met with—but believe that ascites is a later manifestation of the disease as a result of the toxæmic condition of the blood. This toxæmic state depends upon the cirrhotic liver being unable to destroy the poisons that are continually passing to it from the alimentary canal, and these poisons, reaching the general circulation, exert a lymphagogue action and lead to œdema of the feet, ascites, etc. They therefore urge that the formation of an artificial collateral circulation, while it may modify portal engorgement, would not tend to improve the general state of the health, but rather the reverse. However, if such a collateral circulation does lead to improvement, the improvement might be explained in two ways : 1. By diminishing the flow of blood through the liver it may enable the liver to deal more efficiently with the blood that passes through it, and so reduce the toxæmic condition. 2. The increased vascular supply to the surface of the liver may enable the hepatic cells to undergo compensatory hyperplasia by improving their nutrition. This compensatory hypertrophy of the liver will enable the organ to carry on more efficiently its important functions, and so lead to a latency of its symptoms.

In refutation of this latter theory, namely, that the ascites is due to the toxæmic condition of the blood, we would advance the following argument : 1. The hemorrhages from the stomach and bowels in the early stage of the disease do not necessarily prove that the pressure in the portal vein is then at its highest, as they also may be accounted for in nature's attempt to increase the collateral circulation by enlarging the œsophageal and hemorrhoidal plexuses, such enlarged vessels having less resistance to the pressure than normal ones. 2. The lymphagogue action of the toxæmic poisons in the general circulation should exert such action wherever the general circulation goes, and we should have, besides œdema of the legs, œdema of the hands, of the face, of the brain, etc., effusions within the pleura, pericardium, and membranes

of the brain, and the most prominent effusion should not be where alone
the portal blood exists, namely, the peritoneum. 3. In the first case
we reported—a man requiring frequent tappings for the relief of ascites
—artificial adhesions were produced. The man lived two months with-
out a return of ascites, dying as a result of progressive toxæmia. His
liver was about half the normal size. If toxæmia had been the cause
of the ascites the fluid should have reaccumulated, for he died a toxic
death.

We would therefore hold that with our present knowledge as to the
cause of ascites in cirrhosis of the liver the mechanical explanation is
the best, and that through the relief of the portal congestion, either by
the existing channels or by the production of new ones, ascites may be
prevented.

The effects of portal blood passing directly into the general circula-
tion have been very carefully studied in a series of experiments in dogs.
N. V. Eck, in 1874, conceived the idea of establishing a permanent
communication between the vena cava and the portal vein after ligature
of the latter at its entrance into the liver. The experiments were very
fatal. Of eight dogs treated in this manner seven died within a week,
and one, after living two and a half months, ran away and was lost
before the effects of the operation could be studied. J. J. Stolnikow
repeated Eck's experiments in 1882 with equally fatal results. The
post-mortem examinations of the liver in his cases showed neither
macroscopically nor microscopically any change from the normal. The
gall-bladder was filled with bile, the intestines contained bile, and the
stools were of normal color. In no case was there any degeneration or
necrosis of the liver. This is, of course, natural, as in no case was the
nutrition of the liver (the hepatic artery) interfered with. It is inter-
esting to note that bile was still formed, although all portal blood was
cut off from the liver.

In 1892 Hahn, Massen, Nencki and Pawlow began a similar series
of experiments, and, owing to improved instruments and an antiseptic
technique, their results were much less fatal. Of sixty dogs operated
upon twenty recovered and were carefully studied. The facts brought
out are extremely interesting. A considerable number of dogs
showed an immediate change in disposition, which lasted for a longer
or shorter period. Gentle and obedient dogs became cross, peevish,
and disobedient, and some so fierce that they could not be approached.
Stages of excitement and depression followed each other, the ataxic
gait was noticed, and stupor, coma, and convulsions were present. Such
symptoms were sometimes followed by death, but often the dog entirely
recovered. They appeared, as a rule, immediately after operation, but
occasionally were delayed for days. The temperature following opera-
tion was always subnormal, and the following day it would rise one or

two degrees and remain there for ten or fifteen days. Some dogs lost progressively in weight until their death; others kept their weight or even gained. When a dog was fed with meat the above symptoms speedily appeared, sometimes with a fatal result; when fed with non-nitrogenous foods they seemed perfectly well. Such phenomena resemble closely a toxæmic or uræmic condition in man, and seemed to be the result of nitrogenous foods. The experiments teach us that if portal blood is to be brought directly into the systemic circulation this should be done gradually, in order to avoid an overwhelming toxæmia; and also when a collateral circulation is established, and our patient shows signs of excitement or depression, nitrogenous foods should be reduced or entirely cut off for a period of time.

Tilmann undertook another series of experiments on dogs to prove the value of peritoneal adhesions in forming a collateral circulation. He found that all dogs in which he ligated the portal vein, or the mesenteric vein before it was joined by the gastric and splenic, died. In one the mesenteric vein was ligated and at the same time the omentum was stitched to the abdominal wall. Death occurred in thirty-six hours. In one the peritoneum was partially stripped from the abdominal parietes and the omentum placed between it and the rest of the abdominal wall; the intestines were at the same time irritated with antiseptic solutions. Eight days later the abdomen was reopened and the mesenteric vein ligated. The dog was very ill with hemorrhages from the bowel. Eight days later he was again reopened and the portal vein ligated at its entrance to the liver. Bloody stools again appeared, but the dog recovered. Innumerable small veins became apparent on the abdominal wall. A large hernia developed in the scar of the first operation, which later ulcerated, with profuse hemorrhage. After twelve weeks the dog was killed. The mesenteric vein was changed into a fibrous cord, but the portal vein had not entirely closed, a central channel remaining of the size of a pin-head. There was fatty infiltration of the liver. Such an experiment clearly indicates the possibility of peritoneal adhesions developing very numerous and efficient channels of communication with the systemic veins, and also the value of such communications when the portal system is obstructed. Further proof that such a collateral circulation may be readily produced in man is shown in one of Morison's cases and also in one of ours (the pathological findings are detailed above). Morison's case had been operated upon two years before death for ascites with cirrhosis of the liver. Since then the patient had regained normal health, and death followed an operation for ventral hernia. At the necropsy the liver, spleen, omentum, and intestines were found attached to the anterior abdominal wall, with numerous band-like adhesions. Many of these adhesions seemed to contain little beside bloodvessels, and in several of them the

vessels were four inches in length. Some were the size of a normal radial artery.

It has been held by some authorities that improvement in the cases following operation may be due to the simple laparotomy, and they instance the cure of tuberculous peritonitis by such means. Many cases, through mistakes in diagnosis, have had laparotomy performed, and when cirrhosis of the liver was found were closed without further operative procedure. In such cases no benefit was derived from the operation. In a case reported by Talma a simple laparotomy had no effect on the ascites. A little later a second operation was performed and the omentum stitched to the abdominal wall. This resulted in a cure of the ascites.

THE OPERATION. A variety of different methods have been used to produce a collateral circulation through peritoneal adhesions. The abdomen has been opened in the median line above and below the umbilicus, in the right semilunar line and on a line parallel with and one inch away from the right costal border. The omentum has been sutured to the incision alone and to the anterior abdominal wall. The parietal peritoneum has been detached and the omentum sutured between it and the abdominal wall. The omentum has been brought between the liver and the diaphragm and sutured there. The surface of the liver and spleen and intestines has been irritated, and also the peritoneum overlying them. The peritoneal surfaces have been irritated with dull and sharp curettes, with the blade of forceps, with a hat-pin, with fingernails, and with sponges. Drainage has been used, and, on the other hand, the abdomen has been closed without it. Ether, chloroform, nitrous oxide gas, and local anæsthesia have all been used. In view of the danger of kidney complications, two cases having died from uræmia, I (Le Conte) would strongly condemn the use of ether.

I (Le Conte) should recommend the following method under local anæsthesia or chloroform narcosis: The incision is made above the umbilicus and a little to the left of the median line, so that no injury may come to the vein in the round ligament. The liver is then inspected and palpated to confirm the diagnosis. A small opening in the median line above the pubis is made, and through this the fluid is siphoned off while the operation above is being completed. The parietal peritoneum over the omentum, liver, and spleen (if the latter organ is enlarged) is dried and gently rubbed with a gauze sponge, the same treatment being also given to the surfaces of the organs. Rougher handling is entirely unnecessary, as a healthy peritoneum when brought in contact with dry gauze for a fraction of a minute will retain the impression of the gauze mesh. The omentum is then stitched in two or three places with catgut to the anterior abdominal wall and the incision closed. If the operation is undertaken in a

hospital, where you may be reasonably sure that a drainage-tube will be properly cared for, drainage may be made through the lower opening, particularly in cases where the ascites has been rapidly reaccumulating. If you have no confidence in the nursing, close the lower wound also and resort to tapping until such time as the collateral circulation has been established. Drainage is very useful for three or four days, until the adhesions can become firm. To use it for more than a week seems to be a useless risk to the patient, as a tube tract is probably not formed so quickly as in an ordinary laparotomy, owing to the abundant secretion of fluid, and therefore the dangers of infection are greater. If the Trendelenburg table is used, the patient may be raised to a semi-sitting position while the ascitic fluid is being siphoned off. After the dressing is applied the abdomen should be encircled with broad adhesive straps from the ensiform cartilage to below the umbilicus, in order that the parietal peritoneum may be brought and kept in contact with the visceral. The operation can be quickly finished, and should be scarcely more dangerous than an exploratory laparotomy ; but we must remember that other organs beside the liver are frequently diseased (the heart, kidneys, and bloodvessels), and such subjects endure operative interference but poorly.

We have been able to collect from the literature twenty-two cases. Ewart's case has not been added to the table, as the post-mortem proved it to be one of calcareous adherent pericarditis, and not one of cirrhosis. A case by Delagénière and two Italian cases have also been omitted, because we have been unable to find any authentic report of their histories or the results of operation, although a cure is said to have been brought about. One case (No. 4) was included, although the diagnosis of cirrhosis was doubtful and was not confirmed at operation.

These twenty-two cases represent all we have been able to gather from the literature on the subject. In what proportion they represent the total number of cases operated upon we have no means of knowing. Small as the number is, it is all we have from which to draw our conclusions. We may look at this table in three ways. Taking all the cases recorded in it we have a total of twenty-two operations, with five immediate deaths (death ensuing from a few hours to fourteen days after operation), three ultimate deaths (the period of life varying from two to nine months, two having no improvement in the ascites and one with the ascites cured), three unimproved, two improved (where the ascites recurred more slowly and in lessened amount), and nine recoveries. Placed in percentages it will read :

Immediate death	.	.	.	.	.	22.7	per cent.
Ultimate death	.	.	.	.	.	13.6	"
Unimproved	.	.	.	.	.	13.6	"
Improved	.	.	.	.	.	9.1	"
Recovered	.	.	.	.	.	40.9	"

No.	Date	Operator	Sex and Age	Condition of liver	Operation	Result		Ascites	Remarks
						Immediate.	Ultimate.		
1	1889	Van der Meule	......	Cirrhotic (?)	Omentum stitched in wound (?)	Death from shock.	......	......	During delirium patient tore off dressings, and infected wound. Death from peritonitis.
2	1891	Schelkly.	M.	Cirrhotic.	Omentum stitched in wound (?)	Death 14 days.	......	......	Failure attributed to atrophic condition of the liver.
3	1892	Thomas Lens.	M. 61	Atrophic cirrhosis.	Omentum stitched in wound.	Recovery.	Death 6 mos.	Unimproved.	Frequent tapping required. Diagnosis of cirrhosis not confirmed.
4	Sept., 1894	R. Morison (Drummond).	F. 42	Large, pale, smooth (not cirrhotic).	Liver, spleen, omentum, and parietal peritoneum sponged; drainage.	"	Death 19 mos.	Unimproved.	Well two years later. Death due then to operation for ventral hernia.
5	Oct., 1895	R. Morison (Drummond).	F. 39	Typical cirrhosis.	Liver, spleen, omentum, and parietal peritoneum sponged; drainage.	"	Recovery.	No recurrence.	Three operations. Two years after seemed perfectly well. Spleen much smaller; liver still hard but functions good. No ascites.
6	March, 1896	Von Eiselsberg and Narath (Talma).	M. 9	Enlarged, surface granular; spleen enlarged.	Gall-bladder and omentum stitched to abdominal wall; no drainage.	"	"	Trace.	Depression and excitement followed operation. Well two years after, and no return of ascites.
7	Jan., 1897	R. Morison.	M. 42	Small, hobnailed; spleen six times normal size.	Liver, spleen, omentum, and intestinal coils sponged; drainage.	"	"	No recurrence.	Well. Complications, large interligamentary ovarian cyst and umbilical hernia. Cirrhotic kidneys. Death due to uræmia.
8	March, 1897	R. Morison.	F. 54	Advanced cirrhosis; spleen enlarged.	Omentum sutured; no sponging.	Death 11 days.	......	......	Death. Melancholy before operation; after, delirium and melancholy. Improved by reduction in nitrogenous foods. Eventually recovered entirely.
9	Oct., 1898	Narath (Talma).	M. 59	Hard, nodular, capsule thick; spleen enlarged.	Omentum and parietal peritoneum sponged and stitched together.	Recovery.	Recovery.	No recurrence.	Septic peritonitis from drainage-tube. Echinococcus cyst of liver.
10	Nov., 1898	R. F. Weir.	M. 39	Cirrhotic, nodular, and fatty.	Liver scraped with hat-pin; omentum stitched to abdominal wall; drainage.	Death 5 days.	......	......	

No.	Date	Operator	Sex, Age	Condition of liver	Operation	Operative result	Result	Ascites	Remarks
11	Nov., 1898	A.E.Neumann.	F. 45	Hard, firm, smooth; spleen enlarged.	Parietal peritoneum curetted and omentum stitched.	Recovery.	Recovery.	Trace.	Well six months later. Veins over abdomen and around umbilicus prominent; no syphilis.
12	1899	Emil Ries.	F. 38	Nodular, hypertrophic cirrhosis.	Omentum sutured; no drainage.	"	"	Never present.	Adhesions present between liver. Operation for hemorrhages from bowel; this was cured.
13	March, 1899	Narath (Talma).	F. 67	Small, hard, nodular, markedly fibrous.	Omentum sutured; no drainage.	"	Unimproved.	Unimproved.	Ascites chylus. Liver cirrhosis secondary to chronic peritonitis.
14	May, 1899	Folmer (Talma).	M.	Enlarged, hard, granular.	Parietal periton'm scraped with curette; omentum sutured.	"	Unimproved.	Unimproved.	Cirrhosis secondary to chronic peritonitis. Adhesions already existed between liver, spleen, omentum, and the abdominal wall.
15	July, 1899	G. R. Turner (Rolleston).	M. 45	Hobnailed; spleen enlarged.	Surface of liver rubbed with finger-nail, director, and sponge; no drainage.	"	Recovery.	Trace.	Well four months later. Omentum sutured between liver and diaphragm; depression followed operation. Syphilitic.
16	July, 1899	G. R. Turner (Rolleston).	M. 52	Marked cirrhosis.	Surface of liver rubbed with finger-nail, director, and sponge; no drainage.	"	Unimproved	Unimproved.	Margin of liver sutured to abdominal wall. Omentum not sutured. No syphilis.
17	Nov., 1899	Grinon	F. 47	....	Parietal peritoneum detached and omentum brought between; no drainage.	"	Improved.	Diminished.	Marked venous development on abdominal wall. Urine scanty previous to operation, now normal in amount.
18	Nov., 1899	A. A. Babroff.	F. 38	Atrophic cirrhosis.	Omentum sutured; no drainage.	"	Recovery.	Trace.	Veins about umbilicus became enlarged.
19	1900	Bossowski.	F. 9	Cirrhotic.	Cholecystotomy.	"	Improved	Decreased.	Ascites returned more slowly.
20	July, 1900	C. H. Frazier.	M. 45	Cirrhotic.	Parietal peritoneum and omentum sponged and sutured; no drainage.	"	Recovery.	Tapped twice.	Three months after seemed well and free from ascites. Syphilitic.
21	Oct., 1900	R. G. Le Conte (Packard).	M. 63	Firm, small, dark, and fibrous; spleen four times normal size.	Surface of liver, spleen, omentum, and parietal peritoneum sponged; omentum sutured; drainage.	"	Death 61 days.	No recurrence.	Death; toxæmia result of atrophic condition of liver. Mental depression at times marked. Abdominal veins became very prominent. No syphilis.
22	Oct., 1900	R. G. Le Conte (Packard).	M. 52	Enlarged, hard, nodular; spleen normal.	Surface of liver, omentum, and parietal peritoneum sponged; omentum sutured; drainage.	Death 4 days.	....	....	Died with uræmic symptoms and suppression of urine. Post-mortem was refused. Syphilitic.

If we eliminate the first three cases because the operative procedure at that time seems faulty and the technique not as perfect as it is to-day, and also the fourth case because the diagnosis of cirrhosis is doubtful, we have a total of eighteen cases, with three immediate deaths (one from infection and two as the result of kidney complications), one ultimate death, three unimproved, two improved, and nine recoveries.

Placed in percentages they will read :

Immediate death	.	.	.	.	.	16.6 per cent.		
Ultimate death	.	.	.	.	.	5.5	"	
Unimproved	.	.	.	.	.	16.6	"	
Improved	.	.	.	.	.	11.1	"	
Recovered	.	.	.	.	.	50.0	"	

If we still further eliminate No. 8 because the operation was complicated by the removal of a large interligamentary ovarian cyst and the radical cure of an umbilical hernia, and No. 10 on account of the presence of a hydatid cyst of the liver, and also Nos. 13 and 14 because the cirrhosis of the liver was not primary, but secondary to a chronic peritonitis, we will have a total of fourteen cases, with one immediate and one ultimate death, one unimproved, two improved, and nine recoveries. In the table of percentages it will read :

Immediate death	.	.	.	.	.	7.1 per cent.		
Ultimate death	.	.	.	.	.	7.1	"	
Unimproved	.	.	.	.	.	7.1	"	
Improved	.	.	.	.	.	14.3	"	
Recovered	.	.	.	.	.	64.3	"	

Contrasting the worst view with the best possible construction we can place on this table, we have the operative mortality lying somewhere between 23 per cent. and 7 per cent. and the recoveries between 41 per cent. and 64 per cent. When we remember that the cases subjected to operation had been for weeks or months under careful medical treatment and had been repeatedly tapped, and that their condition was unimproved or growing steadily worse, the above statistics are certainly very encouraging. Weir has aptly said, " Of necessity, in the early stages of any surgical measure such as this, one must and should operate only on those patients who are regarded as hopeless of cure by any other means." This, of course, reduces the chances of success to a minimum.

It is interesting to note that in one case (No. 12) operation was undertaken on account of severe hemorrhages from the bowel. The patient had hypertrophic cirrhosis without ascites, and after operation the hemorrhages ceased. Talma in this connection recommends that where hemorrhages from the œsophageal plexuses are free operation should be performed.

In speaking of the chances of success or failure after operation Talma lays particular stress upon two points : 1. That the cirrhosis of

the liver is a primary one, and not secondary to some other disease, as chronic peritonitis with serous effusion. How such a differential diagnosis may be made before operation we do not know, but the points of difference when the peritoneum is once opened are marked. In a primary cirrhosis the thin and glistening character of the peritoneum is scarcely altered from the normal, although many fine injected bloodvessels may be seen through it, while in chronic peritonitis the membrane is tough, much thickened, and has lost its glistening character. 2. That the function of the liver cells must still be good. If the liver is so atrophied that the functions of its cells are reduced to their lowest ebb it is not to be presumed that operation will restore such function or prolong life, although the ascites may not return.

Let us look for a moment at some of the opinions expressed by others. Rolleston and Turner advise early operation, before the liver tissue becomes so degenerated as to be beyond the hope of undergoing any improvement. They believe that medical treatment should be persisted in only while the diagnosis is in doubt, and should be especially directed to counteract any possible syphilitic disease of the liver. When a course of iodide of potassium has not benefited a case of ascites which is thought to be due to either syphilis or cirrhosis, medical treatment should be suspended and operative measures employed. They further recommend that when cirrhosis can be diagnosed with fair certainty in the pre-ascitic stage, from the presence of hæmatemesis, enlarged spleen, etc., operative treatment would probably succeed better than in the later stages. Morison believes that it is no longer advisable to treat ascites due to cirrhosis of the liver by repeated tappings if the patient is otherwise sound and in fair general condition. After one or two tappings have failed operation offers the best chance for a prolonged and useful life. Talma's views are practically the same. Friedmann states that a *sine qua non* before operation is undertaken is that the liver cells must still have the power to act—*i. e.*, before the liver is too far degenerated—and recommends operation not later than after the second tapping.

Expressions such as these, by men who have given the subject much thought and careful study, and who have had a personal experience with the operation, are not to be brushed aside lightly.

Conclusions. *A priori* cases of cirrhosis of the liver stand injury badly, and therefore are poor subjects for operation. The resistance of their tissues is presumably much less than in health. The exact estimation of the amount of degeneration of the various organs, including the liver, is extremely difficult or impossible, consequently the mortality of the operation under consideration would naturally be expected to be relatively high. The statistics given above seem to show that the operation has won a distinct place, and in the future a clearer conception of

the suitability of particular cases for the operation may be possible. Without operation these patients as a class are doomed to a life of perpetual invalidism, requiring constant treatment and repeated tappings to make life bearable.   It is our opinion that where the diagnosis of pure portal cirrhosis of the liver can be made, and where persistent and well-directed medical treatment is productive of insignificant results, the operation should be strongly recommended.   On the other hand, it would seem that the operation is scarcely indicated, if not contraindicated, in cases of ascites associated with other kinds of cirrhosis (Hanot's, syphilitic, mixed, etc.), or with chronic peritonitis.

NOTE.—In an abstract in the *Lit. Beilage der deutsch. med. Woch.*, January 3, 1901, p. 7, reference is made to an article by P. Commandini and W. Salvolini (*Gaz. degli Ospedali e del. Clinic.*, No. 150) in which two cases of cirrhosis of the liver are reported where the omentum was sutured to the abdominal wall.   In one death occurred on the fourteenth day after operation, in the other the ascites quickly returned. The reference was seen too late for incorporation into our table.

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SPLENIC–MYELOGENOUS LEUKÆMIA WITH PULMONARY TUBERCULOSIS.

REPORT OF CASE.

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The association of pulmonary tuberculosis with any variety of true leukæmia is exceedingly rare. Medical literature contains the reports of several cases in which there was a combination of lymphatic leukæmia with tuberculosis. In the terminal stages of pseudo-leukæmia, far-reaching tuberculous changes in the various organs of the body are frequently found.

Splenic-myelogenous leukæmia, combined with tuberculosis, is of such rare occurrence that there is practically no literature on the subject at the present time. The rarity of these complications is made positive by the fact elicited through private correspondence that clinicians and pathologists of such wide experience as Stengel, Osler, Cabot, Prudden, and Janeway have never seen a case.

The case which we are about to report is one of splenic-myelogenous leukæmia associated with advancing pulmonary tuberculosis. The physical signs, the blood and sputum examinations are characteristic, and make the diagnosis positive.

On December 25, 1899, Dr. Breese referred Mr. Daniel O. to us for diagnosis. The patient is a baker, was born in Ireland, and is a married man, aged forty years. He has one child seventeen months old, to all appearances perfectly well. His environment has been favorable, though his habits have not always been good. For several years he has been addicted to the use of whiskey, but says that during the past few months he has not taken spirits.

Family History. The father of the patient is seventy years of age, and is enjoying excellent health. The mother died after several years of sickness, during which there was progressive loss of weight. Her symptoms were suspicious of general tuberculosis. One brother died of pulmonary tuberculosis at the age of thirty ; another brother died of typhoid fever ; otherwise the family history is negative. He denies having had syphilis ; had gonorrhœa twelve years ago. After his twentieth year he had measles.

Present Illness. For many months before the advent of continuous symptoms the patient complained of a sense of fulness in the abdomen and a progressive increase in its size. His general health had been below par. He was less active than usual, and had become depressed. Early in the spring of 1899 the patient complained of feeling tired, felt

that he was growing weaker from day to day ; his work became irksome. Increasing general malaise with a sense of weight in the abdomen were among his most annoying symptoms. He says that he was so weak after finishing his work that he was forced to take a drink of whiskey before going home. These symptoms persisted three or four weeks, when he noticed that his abdomen was becoming more and more prominent. During the summer the abdominal symptoms increased, the most prominent being the sense of weight, a dragging sensation, occasional pains ; these were never severe, but caused more or less faintness.

About November 15, 1899, his color changed. He noticed that he was growing pale and sallow. Exercise or any muscular effort caused shortness of breath. About this time he commenced to cough, and during the last days of November he had occasional night-sweats. From November 15 until December 26, 1899, he averaged about three night-sweats each week. After December 25th his night-sweats became more frequent. At the present time he has these every night unless controlled by medicines.

About November 20, 1899, the patient's cough was so troublesome as to require treatment, and it was not until that time that he consulted a physician. He continued with his first physician but a few days, when he consulted a second, owing to the recognition of a tumor in the abdomen. His second physician called a third in consultation. It was decided that he had a tumor, and he was recommended to go to the hospital. About this time (December 25, 1899) Dr. Breese was called to see the patient. His leading symptoms were cough, pains in the back and across the abdomen, night-sweats and slight fever. His temperature averaged between 101° and 102° F. His pulse was uniformly accelerated.

When Dr. Breese sent the patient to us for examination his temperature was 100.2 ' F. in the morning, pulse 96, and respirations 28. The color of the patient was characteristic. He appeared sallow, anæmic, and his face looked puffy. His weight was about 150 pounds. He had lost about fifteen pounds during the preceding three months. Close questioning failed to show that he had ever suffered from enlarged cervical glands or enlargements of any kind in any part of his body.

A few days after we first examined the patient he developed pleurisy without effusion, and during the following three weeks had a temperature which averaged 102° F. His pulse remained accelerated. From this acute complication he made a slow recovery, and believes that his general condition has been slightly improved since. The patient's cough has grown more annoying, however, and during the past five weeks has kept him awake more or less during the night.

The expectoration from November 15, 1899, until about the middle of January, 1900, was thin and watery, with occasional streaks of blood. Since January 15, 1900, the expectoration has become thick, greenish in color, mucopurulent, and nummular. Repeated bacteriological examination of the thin sputum before February 20, 1900, failed to show the presence of tubercle bacilli, though there were occasional shreds of fibrous tissue. Since that time, with an increase of and change in the character of the sputum, tubercle bacilli have been found. The expectoration continues to be blood-streaked.

On April 7, 1900, the patient complains of more profuse night-sweats than ever before. He says that his cough is growing more harassing,

Fig. 1
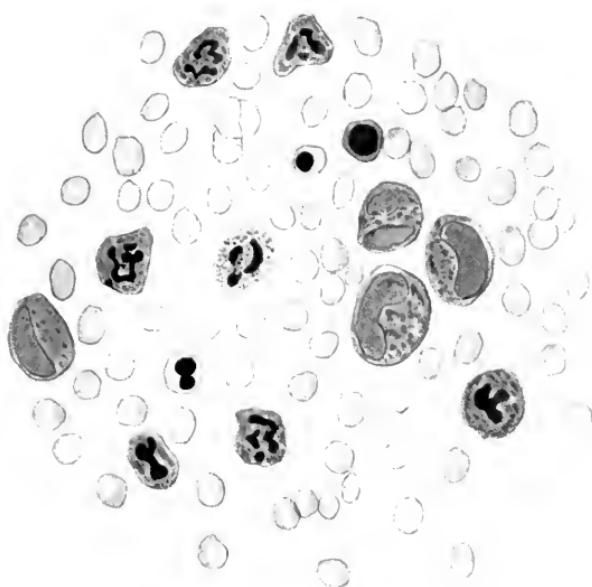
Appearance of the Blood-film Stained with Eosin and Methylene-blue.

Fig. 2.
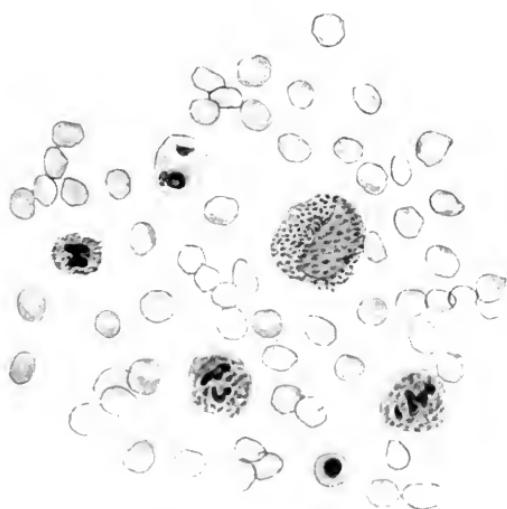
Appearance of the Blood-film Stained with Ehrlich's Triacid Mixture.

that the sense of weight is almost constant; in fact, the abdominal symptoms have increased during the past two weeks. There are no symptoms referable to the eyes; he rarely has tinnitus aurium; he has a slight nasal catarrh; examination of the mouth and fauces is negative; the teeth are fairly well preserved; the tongue is moist, heavily coated; breath is offensive; the skin presents the same characteristic appearances, considerably increased, which were noticed when the patient was referred to us.

Physical Examination. The superficial glands throughout the body are not palpable; there are no cicatrices visible. The heart-sounds are normal; the abdomen is abnormally prominent, and the abdominal veins are enlarged. Muscular development is fair.

Lungs. On December 25, 1899, inspection shows the thorax well developed, excursions of its left half less free than are those of the right. The pectoral reflexes on both sides are enormously exaggerated. Percussion gives high pitched resonance at the left apex in the supra-

clavicular and infraclavicular regions, the dulness is continuous with that of the cardiac region. Posteriorly in the left suprascapular and interscapular regions the percussion-note is flat. Both anteriorly and posteriorly there is roughened and markedly exaggerated breathing, vocal fremitus and voice-sounds are decidedly increased. The percussion-note at the right apex anteriorly is found clear, while posteriorly in the interscapular region it is abnormally high pitched, and the breathing is bronchial in character.
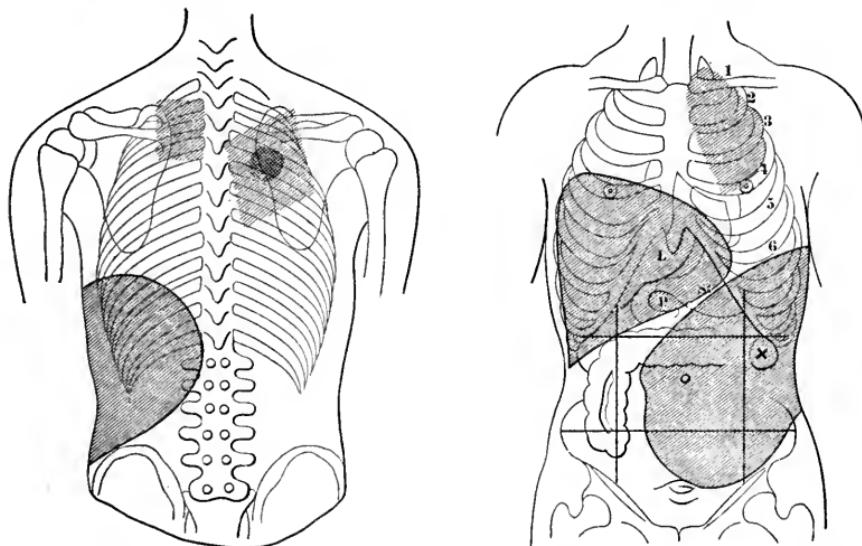
On April 5, 1900, the areas of dulness and flatness are found increased. In the upper half of the interscapular region on the right side there is cavernous breathing. These changes are shown in the accompanying diagrams. On the anterior surface of the posterior laryngeal wall there is deep tuberculous ulceration. The patient has been hoarse during the past month. The temperature was 100° F., pulse 96, respirations 24.

Liver. The liver reaches to the upper border of the fourth rib anteriorly. In the epigastric region the liver dulness is almost entirely lost in the flatness caused by the enormously enlarged spleen.

Spleen. The left half of the abdomen is occupied by the spleen, which reaches about three finger-breadths beyond the median line toward the right. The percussion-note of the abdomen is flat, except in the dependent regions on the right side and over the ascending colon. The border of the spleen is smooth, except in the umbilical region at the extreme right, where the organ is notched and uneven. It is about three or four inches thick along its palpable border; pressure does not cause pain.

On April 12th a report from the patient stated that he felt weaker, his appetite was fair, bowels regular, and that pressure-symptoms on lying in bed were increasing. Standing and walking are becoming difficult because of the great weight of the spleen. All other symptoms remain unchanged.

The quantity of urine voided in twenty-four hours was 760 c.c., specific gravity 1029, strongly acid; there was neither albumin nor sugar present; urea, 2.9 per cent.; total quantity in twenty-four hours, 21.4 grammes; uric acid, 1.56 grammes in twenty-four hours, or 0.2 per cent.

Blood Examination. The following table demonstrates clearly the characteristic changes found in the blood, with differential counts:

Date.	Red cells.	White cells.	Hæm. per cent. (Gowers).	Polymorphonuclear neutrophiles.	Myelocytes	Lymphocytes.	Eosinophiles.	Basophiles.	Transitional.	Normoblasts.	Remarks.
Jan. 25	3,200,000	320,000	62	57	31	4.4	6.5	Few	Few	Many	Many eosinophilic myelocytes and dwarf cells; some microcytosis and poikilocytosis.
Mar. 10	3,280,000	132,000	62	52	38	4.1	5.7	Few	Few	Many	A few megaloblasts, one 19 by 22 μ in diameter; otherwise as above.
Mar. 17	3,300,000	162,000	64	57	34	4.2	4.7	Many	Few	Many	Fewer normoblasts, but still plentiful; many eosinophilic myelocytes.
Mar. 24	3,320,000	127,000	62	67	22	4.5	6	Few	Few	Few	Marked microcytosis and poikilocytosis.
Mar. 31	3,200,000	124,000	58	69	16	6	3.5	4.5	Few	Very many	Nucleated reds in great numbers.
Apr. 7	3,320,000	126,000	56	65	17	7.5	5.5	3	Few	Many	Red cells decidedly pale. Poikilocytosis marked.
Apr. 16	2,922,000	121,500	55	68	17.5	6.5	5.2	Very few	Few	Very many	Red cells pale; numerous megaloblasts.

On December 31, 1899, the first blood examination was made. This examination is not included in the table which accompanies the paper, because no differential count of leucocytes was made. Dr. Larkin reported hæmoglobin, 52 per cent.; red count, 3,286,000; leucocytes, 320,000; color index, 0.8. There was an increase in the polynuclear

neutrophiles and myelocytes. Normoblasts were found; there were microcytosis, moderate macrocytosis, and poikilocytosis. Another examination made February 9, 1900, not included in the table, showed hæmoglobin 49 per cent.; 2,680,000 reds; 240,000 whites; color index, 0.9 per cent. The gross microscopical find is the same as December 31, 1899.

The differential counts showing the enormous percentage of myelocytes brand the case as one of splenic-myelogenous leukæmia. The large number of myelocytes may be considered pathognomonic. The average of these in our case is 26 per cent. At one time, before the tuberculous process was far advanced, we found 38 per cent. There is a marked relative reduction in the number of lymphocytes which vary in the counts from 4.1 per cent. to 7.5 per cent. The varieties blend; atypical and transitional forms are plentiful. The eosinophiles are increased actually and relatively. Many of these are myelocytes and dwarf cells.

This latter condition is frequently present in splenic-myelogenous leukæmia, but it is not pathognomonic. The basophiles or "mastzellen" of Ehrlich are plentiful, but this increase is neither characteristic nor has it pathological significance. The number and condition of the red cells is typical. The usual mild anæmia with slight changes in the size and shape of the erythrocytes is present. The count ranges between 2,922,000 and 3,320,000. The presence in the blood of large numbers of normoblasts with occasional megaloblasts without the symptoms of grave anæmia is characteristic of splenic-myelogenous leukæmia, and is due to the involvement of the bone-marrow. The hæmoglobin percentage is absolutely and relatively diminished. With the advance of the tuberculosis in our case the red cells change but little. In spite of increasing debility and great exhaustion there is practically no reduction in their number nor change in their condition. Relatively high counts are frequently made in advanced tuberculosis. The concentration of the blood resulting from excessive sweating and expectoration accounts for this condition (Cabot[1]).

We find a gradual and steady decrease in the total number of leucocytes, but an increase in the percentage of polymorphonuclear neutrophiles, a decrease in the number of myelocytes, and an increase in the number of lymphocytes as the tuberculous process advances. The blood, however, retains all of the characteristics of splenic-myelogenous leukæmia.

In connection with the study of the blood in this case, it is exceedingly interesting to note the changes which follow as the tuberculous process advances.

We have been able to find in medical literature four well authenticated cases of leukæmia with tuberculosis which we shall consider later

in this paper, the blood counts of which we shall consider at this point
(Quincke,[2] Stintzing,[3] Lichtheim,[4] Baldwin).[5]

In the case of Quincke,[2] which was, in all probability, a case of
mixed leukæmia of the splenic-myelogenous and lymphatic varieties,
acute miliary tuberculosis supervened. With increase of the tuber-
culous symptoms there was, as in our case, a marked reduction of char-
acteristic leucocytes. With this reduction and disorganizing processes
in the lung the spleen and liver enlargements receded materially.

In Stinzing's[3] case, which was in all probability one of lymphatic
leukæmia associated with chronic tuberculosis, the blood at first showed
moderate leukæmia (1 to 100), with a normal red count. With a pro-
gression of the tuberculosis and cavity formation at the apices and the
presence of tubercle bacilli in the sputum the leukæmia improved. The
author says that the lymphatics were less enlarged and there was a
positive reduction of leucocytes, the proportion changing materially
(1 to 150).

Lichtheim's[4] case, which is mentioned by Baldwin,[5] is not of the
splenic-myelogenous variety, with tuberculosis, but is of lymphatic
character. In the report of this case Lichtheim presents a table
which shows a marked reduction in the number of leucocytes as the
tuberculosis progresses. The first count, made on November 22, 1896,
showed 40 per cent. hæmoglobin; 2,000,000 red corpuscles; 250,000
whites; the relative proportion of whites to reds, 1 to 8. On Decem-
ber 28, 1896, the number of whites had fallen to 82,000, the reds in-
creased to 2,800,000. On February 19th following the count of the
white corpuscles was 8900; the reds had increased to 3,300,000. The
proportion of white corpuscles to red, it will be noted, was changed
with the advancing tuberculosis from 1 to 8 to a count showing 1 white
corpuscle to 370 reds. Indeed, Lichtheim in his article makes the state-
ment that at this time no one would have dreamed from a simple blood-
count that the patient had ever had leukæmia. In Lichtheim's case
with an advancing tuberculosis the spleen and lymphatic glands were
much reduced in size.

Baldwin's[5] case of lymphatic leukæmia complicated with tuberculosis,
recently reported, stands alone, so far as we have been able to decide
from the study of the literature at our command, in presenting full and
repeated differential blood counts. The diagnosis was confirmed post-
mortem. Unfortunately, there were no blood counts made early in the
history of this case. The first examination reported was made on Octo-
ber 1, 1897, when 695,000 leucocytes and 3,010,000 red corpuscles were
found (1 to 4⅓). The last count was made December 9, 1897, and
showed 959,500 leucocytes, 2,435,500 red corpuscles (1 to 2½). The
patient died on December 10, 1897, one day after the last count had
been made. In this case with an advancing tuberculosis there was a

marked increase in the number of leucocytes, with a decrease in the number of erythrocytes.

The case which we report is the first of splenic-myelogenous leukæmia with tuberculosis of which we have knowledge, from a study of the literature at our command, in which repeated differential counts have been made. Without these the true character of the leukæmia cannot be decided; with them we can reach positive conclusions. In this belief we are supported by Muir[6] and Bramwell.[7]

We have been much interested in the study of the literature which relates to the changes which take place in leukæmic blood as the result of added infection. It may be assumed to be a fact that with added infection of whatever nature there is likely to be a marked reduction in the number of leucocytes.

Thus, Eisenlohr[8] reports the case of a patient with splenic-myelogenous leukæmia who contracted typhoid fever. The added infection proved sufficient to reduce very markedly the number of leucocytes.

Heuck[9] reports a case of acute infection added to leukæmia in which there was the same decided reduction of white cells.

Mueller,[10] in a case of leukæmia complicated with sepsis, found a reduction in the number of whites from 246,900 to 57,300. Kovac's[11] case of leukæmia complicated with influenza showed a change from 67,000 to 17,000 white corpuscles.

The very decided increase in the elimination of uric acid in our case deserves special mention. This, of course, is not surprising if we subscribe to the theory of Horbaczewski, which he has so graphically brought to the notice of the profession. In the study of this question we find the literature of the subject contradictory and unsatisfactory.

Thus in three cases reported by Laache,[12] Von Noorden,[13] and Quincke,[14] where disease was associated with exceedingly low white counts, the quantity of uric acid in the urine was increased and was found to be 2.2 grammes, 1.6 grammes and 1.8 grammes respectively.

Levi,[15] in his exhaustive article, makes the statement: "We are not to forget that the elimination of uric acid and its derivatives gives no exact clue to the quantity of the uric acid produced within the body. Too much honor is bestowed upon the leucocytes of the blood if we attribute to them alone the changed and increased elimination of uric acid in these cases."

Richter[16] thinks that our clinical and experimental experiences prove that the association of leucocytes and uric-acid excretion cannot be ignored; but yet he says, "All factors considered, they are not sufficient in the present state of our knowledge to permit positive conclusions on this association."

A few words concerning the lung changes in leukæmia may not be out of place.

In Stengel's[17] exhaustive article on leukæmia, under the head of " Respiratory Symptoms," we find the following statement : " Considerable involvement of the lungs themselves (Deiter) may occur, and the infiltrated areas may suffer necrosis and break down, with the formation of cavities resembling those of tuberculosis " (Boettcher).

Reference to the original paper of Deiter[18] shows that the author in considering this subject makes no mention of tuberculosis. He, as well as Birch-Hirschfeld,[19] mentions the occurrence of heteroplastic-lymphoma in the lung as being characteristic of leukæmia. Boettcher's[20] article quotes Ehrlich's[21] statistics given in his Inaugural Dissertation in 1862, in which ninety-eight cases of leukæmia were reported, in twelve of which he imagined that he found tuberculous complication. He does not state in how many of these the lung was involved, and from the fact that disorganizing processes are not uncommon in leukæmic infiltrations and at that early day bacteriological determination was not practised, it seems to us that Boettcher[20] is justified in stating that " without wishing to deny the complication of the two processes I am not satisfied that in those cases where pulmonary tuberculosis has been considered the author has differentiated leukæmic disease of the lung and pulmonary tuberculosis." He says, still further, " In spite of the fact that post-mortem macroscopical experiences seemed to favor the diagnosis of tuberculosis, yet later it was found that this was not correct."

The lymphatic enlargements in the lung may undergo retrograde metamorphoses just as often happens with lymphatic growths in the intestine.

Virchow[22] calls attention to the small lymphoid masses in the pulmonary tissue, particularly in the respiratory mucosa associated with leukæmia. He has found these resembling tubercle on the epiglottis, the aryepiglottic folds, at times reaching into the bronchi. He says " these resemble tubercle, but are not true tubercle structures."

In Epstein's[23] exhaustive article, which includes sixteen post-mortems in cases of acute leukæmia, there was no mention of tuberculosis as a complication, nor were any suspicious lung changes found.

Bramwell,[24] in his recent work on anæmia, and Hoffman,[25] in his *Constitutions Krankheiten*, make no mention of the association of tuberculosis with leukæmia.

Muir[6] says: " In the lymphatic form of the disease the connective tissue of the lungs may be the seat of leucocytic infiltration. The walls of the bronchi and the peribronchial tissue are chiefly affected, and the condition may be diffused or localized so as to form thickening. This change, which may be found only on microscopical examination, is of the same nature as that occurring in the connective tissue of other organs. On microscopical examination also many of the small vessels may be found plugged with leucocytic thrombi, and hemorrhages may

be seen around them. The lungs are generally œdematous, and various other conditions may be present as complications."

Unfortunately, the last sentence of this quotation is not sufficiently definite to justify the conclusion that the author has met tuberculosis of the lung associated with leukæmia.

It is very difficult in our case to decide whether there was a latent tuberculous deposit in the lung before the advent of leukæmia. The early history of the case, including the abdominal symptoms, the characteristic changes in the cellular elements of the blood after the positive evidences of advancing tuberculosis, lead us to believe that pulmonary tuberculosis was superadded, or, if present and latent, did not become active until a number of months after the beginning of the splenic-myelogenous disease.

The case of Quincke,[2] to which we have already referred, was reported by him at the sixty-second annual meeting of the Association of German Scientists and Physicians in Heidelberg. Our study of the report of this case leads us to conclude that there was a mixed splenic-myelogenous and lymphatic leukæmia in which true miliary tuberculosis supervened. In this case no differential counts are reported. We are somewhat confused by Quincke's statement that " in the place of leucocytes there were in the blood large masses of fine, granular protoplasm and blood-plaques." Possibly these " granular masses " were eosinophiles. The spleen and liver enlargement receded materially as the tuberculosis advanced.

At the same meeting Stintzing[3] reported an analogous case in which the tuberculous process was chronic. The patient, who was examined twelve months before, was found with enlarged glands, moderately enlarged spleen, and infiltrating disease of the right apex. The blood examination showed moderate leukæmia (1 to 100), with normal red counts. After six months pulmonary infiltration increased, disorganization was progressive, cavity formation followed at the apices, and tubercle bacilli became plentiful in the sputum. Leukæmic symptoms improved with the advancing tuberculosis. Stintzing[3] reports this case to prove that chronic tuberculosis may materially influence the course of leukæmia.

Lichtheim's[4] case was one of lymphatic leukæmia with infiltrating tubercle. The patient was twenty-six years of age, a male, who twice during the two preceding years had suffered from intestinal disturbances with fever. Seven months before death there was epistaxis, and a splenic tumor was discoverable. The cervical glands were markedly enlarged. The history of the case leads us to conclude that tuberculosis preceded leukæmia. In this case, as we have already mentioned, there was a marked reduction of the leucocytes as the disease advanced. There is no record of a differential count.

Baldwin's[5] case was one of lymphatic leukæmia with tuberculosis. The post-mortem examination revealed characteristic lesions. Baldwin was fortunate in obtaining post-mortem evidence of the correctness of his diagnosis, as tubercle bacilli were never discovered in the sputum.

Weidner's[26] case, which has been suspected to have been one of splenic-myelogenous leukæmia complicated with tuberculosis (Baldwin[5]), cannot be considered in connection with these positive cases, in spite of the fact that the post-mortem showed enlarged and caseous retroperitoneal and mesenteric glands. In this case the lungs were found normal. No microscopical or bacteriological examinations of the caseous glands were made.

We have felt justified in reporting our case as one of tuberculosis associated with splenic-myelogenous leukæmia, because of the physical signs referable to the lung, spleen, and liver, the laryngeal ulceration, the presence of tubercle bacilli in the sputum, the pathognomonic changes in the cellular elements of the blood, and the convincing differential counts.

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HEMORRHAGIC TYPHOID FEVER.[1]

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ESCAPE of blood may take place by rhexis, in consequence of trau-
matic lesions or disease of the vessels ; or by diapedesis, as a result of
increased blood pressure in the capillaries and veins, or of increased
permeability of the vessel walls. The last-named condition may be
due to mechanical, chemic, and thermic influences as well as others
that affect the nutrition of the vessels, including the state of the blood
itself and the nervous supply.

Hemorrhage may occur as the sole or the principal or most constant
symptom, as in the course of such diseases as purpura, scurvy, hæmo-
philia, or as a concomitant of a large number of diseases, apart from
local lesions of bloodvessels. It may be local, being confined to in-
flamed or otherwise diseased structures ; or it may be wide-spread, and
obviously the result of constitutional disturbance. Under the latter
condition it seems not unreasonable to attribute it to changes in the
blood or in the vessels, or in both conjointly, resulting perhaps in
part from the presence of toxic substances in the circulation and in
part from abnormal elevation of temperature when this is additionally
present. Such extravasations of the blood may, therefore, be expected
to occur in the course of any of the infectious diseases, and they have
been so observed, though not as a rule or at all commonly, among
others in typhoid fever.

While epistaxis is one of the most common symptoms of typhoid
fever, and enterorrhagia is not an infrequent complication, generalized
hemorrhage occurs but rarely. To cases attended with the last-named
condition the designation hemorrhagic typhoid fever has been applied.
The bleeding may take place from all parts of the body, beneath the
skin, and into the mucous membranes, as well as the serous cavities.
It may, in rare instances, represent the terminal stage of an attack of
fulminant typhoid fever, although it generally occurs at the height or
at a later stage in cases at first pursuing an ordinary course, or in cases
of protracted duration. It has been observed also during a relapse.
The bleeding generally first takes place from the nose. At the same

time or shortly afterward blood escapes from the discolored and spongy
gums. Next, petechiæ appear in the skin covering the trunk and the
extremities among the roseolæ, which become hemorrhagic only in
part, if at all. In cases of especial severity extensive, deep-seated ex-
travasations take place into the subcutaneous connective tissue even
beneath the scalp. In not a few cases meningeal or cerebral hemor-
rhage occurs. More frequently intestinal hemorrhage takes place—at
times in such abundance and in such rapid succession as to be the
direct cause of death. Hemorrhage from the genito-urinary organs is
less common. Occurring in pregnant women, abortion is invariable,
and death may result in consequence of failure to control the hemor-
rhage. Hæmoptysis is the least common variety of hemorrhage, result-
ing from infarction of the lung or from bleeding from the bronchial,
tracheal, or laryngeal mucous membrane. The hemorrhage may further
be complicated by gangrene or ulceration. The earlier and the more
extensive the bleeding and the worse the general condition the more
unfavorable is the prognosis. The complication is so uncommon that
the report of two fatal cases that came under observation recently
would seem justified. In one the bleeding was wide-spread, while in
the other it seemed confined to the skin.

CASE I.—A man, aged thirty-nine years, who had been a heavy
drinker, was admitted to the Philadelphia Hospital, July 13, 1900, in
a state of delirium, on what, from the statement of his friends, was
estimated to be the twenty-second day of his illness, although he had
not gone to bed, but had continued in his debauchery. He complained
of muscular pain, frontal headache, and sleeplessness. There had been
no epistaxis and no diarrhœa. The man was well nourished and pre-
sented a dusky-brown appearance. He looked stupid and apathetic,
the eyes being dull and staring. The tongue was brown and fissured,
and sordes were present on the lips and teeth. The lower lip was,
besides, the seat of a number of herpetic vesicles. The chest, which
was well built and muscular, was the seat of a diffuse erythematous
rash at the roots of the hair. The pulmonary expansion was good and
equal. The abdomen was tympanitic, although the liver dulness was
evident. There was some tenderness on pressure in the right iliac
fossa. Both the chest and the abdomen were the seat of a rose-colored,
maculo-papular rash, disappearing on pressure. The spleen was
slightly enlarged at first, but only later became palpable. Heart,
lungs, and liver exhibited no abnormality. The pulse was rapid,
weak, and dicrotic. The urine contained albumin and blood cells,
and yielded the diazo-reaction. No response to the Gruber-Widal test
could, however, be secured at this time, although it appeared several
days later.

The nervous symptoms in the case were marked, the delirium per-
sisting, and restlessness and twitching of the muscles of the arms and
legs appearing. The patient reacted well to cold plunges, and he took
his nourishment well. On the sixth day after admission a rose-red
eruption, consisting of elevated areas one-eighth inch in diameter,

FIG. 1.
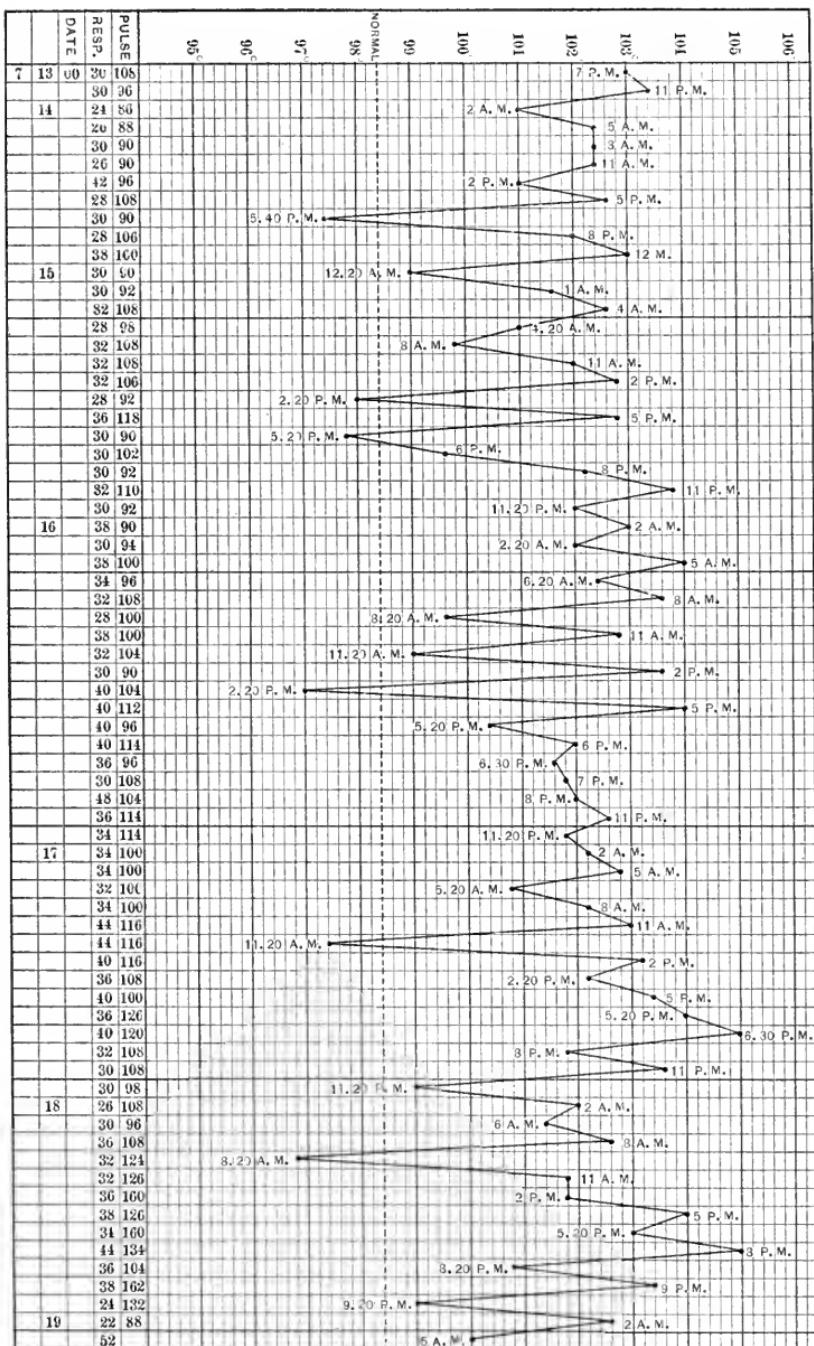
yielding a shot-like sensation to the finger and not disappearing on pressure, appeared on the legs just below the knees, in strikingly symmetrical distribution. At the same time bluish blotches of irregular shape, from one-eighth to one-quarter inch in diameter, not disappearing on pressure and palpable directly beneath the skin, appeared on the upper part of the chest and shoulders. The patient also began to pass blood repeatedly from the bladder, and incontinence of urine was noted for the first time. Later in the day hemorrhage from the bowel was repeated thrice in the course of an hour. The hemorrhagic eruption had now extended all over the body, the areas being bluish in color, irregular in shape, and varying from three-quarters to one and one-half inches in diameter. An extravasation of blood took place also into the cornea of the left eye. The condition of asthenia grew gradually more marked and coma more profound, until death took place on the seventh day after admission.

Upon post-mortem examination the body was found covered with purpuric spots. The fatty layer of the abdomen presented a peculiar orange-yellow color, and was the seat of extravasations of blood. The peritoneal cavity contained a considerable amount of free blood. The peritoneal surface of the stomach and the intestines, the mesentery, and all the remaining abdominal viscera, especially the bladder, as well as the chest wall and the pericardium, were the seat of hemorrhagic extravasations, varying from one-eighth inch to three inches in diameter. The pleural and pericardial sacs also contained blood. The myocardium was involved in parenchymatous degeneration. The lungs were intensely congested and each contained a large infarct posteriorly. The spleen was enlarged and mushy. A Gruber-Widal test made from this organ yielded a positive reaction. The kidneys were intensely congested and the seat of parenchymatous degeneration. Their pelves and pyramids were filled with clots. The adrenal bodies, the pancreas, and the walls of the stomach and intestines were also the seat of hemorrhage. The liver was in a state of parenchymatous degeneration. The bladder was filled with an enormous blood clot, and its walls were constituted of one large blood clot. The intestines were congested throughout, and hemorrhage was most abundant at the ileocæcal valve and in the colon just beyond. The ileum was the seat of five ulcers in varying stages of development, being almost perforated and surrounded by a ring of dense connective tissue. The brain and its membranes were congested, but normal in structure.

CASE II.—A laboring man, aged twenty-eight years, addicted to alcoholic excess, was admitted to the Philadelphia Hospital, July 14, 1900, in a state of delirium and restlessness, with a history of having been sick for a week with weakness and "malaria." His face was dull, heavy, and expressionless; the tongue was dry and covered with a whitish fur. Heart, lungs, and liver exhibited no abnormality. The spleen was enlarged but not palpable. The abdomen was tender on pressure, and gurgling could be elicited in the right iliac fossa. The pulse was rapid, weak, and dicrotic. The extremities were slightly œdematous. The urine contained albumin, but no tube-casts. In the course of three days a rose-colored, maculo-papular eruption appeared on the abdomen and chest, disappearing on pressure. Temporary improvement ensued, but nervous symptoms again became pronounced, with carphology and subsultus. The Gruber-Widal reaction was now

FIG. 2.
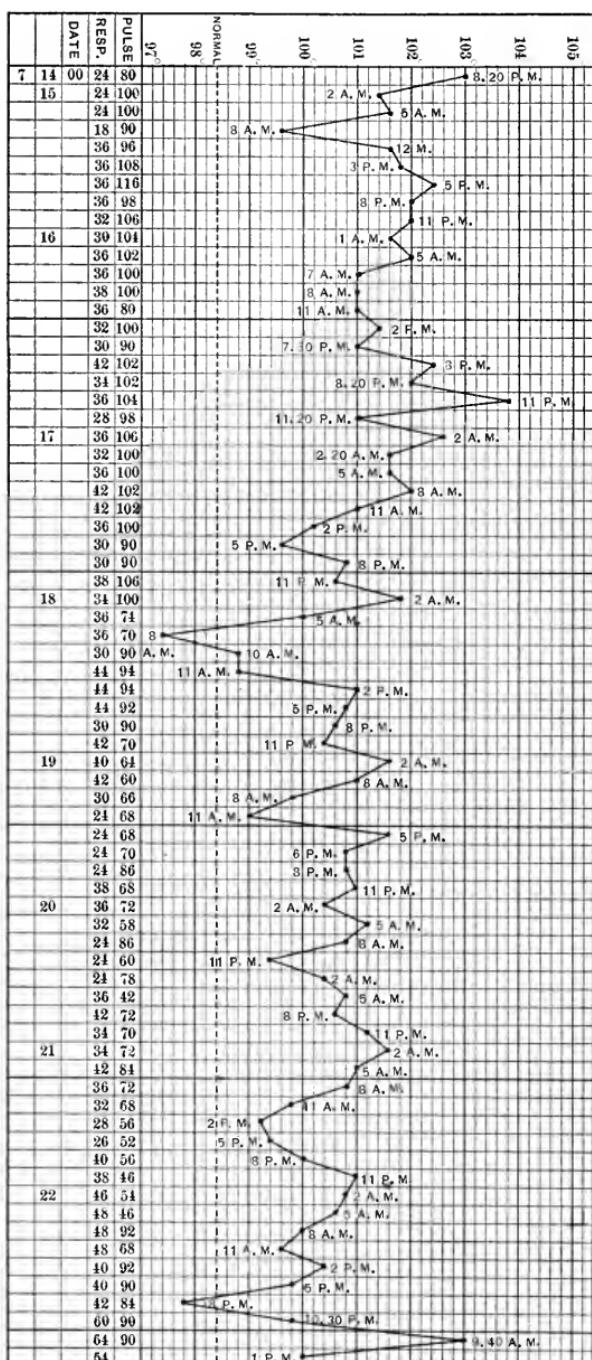
negative, but five days later it was positive. On the fifth day after admission the area of herpetic percussion dulness appeared diminished, and tenderness was present over the liver. Gurgling could be elicited in the abdomen, which was scaphoid in shape and tender. The area of splenic percussion dulness was increased. The tongue was dry, brown, and fissured, and the lips and teeth were the seat of sordes. The conjunctivæ were icteric. The pulse was slow and weak. The patient was sweating profusely. The number of red blood-corpuscles was normal, and a stained specimen of blood exhibited leucocytosis. On the following day a peculiar, dark, rusty-red, papular eruption appeared on the chest and the abdomen, the areas being variable in size, averaging one-eighth inch in diameter and not disappearing on pressure. The urine was now being voided involuntarily, and the weakness appeared more pronounced. By the next day the rash covered the entire chest and abdomen, and had extended to the arms and the legs. It preserved its previous character, although it was darker in color. A peculiarly offensive odor was at this time noticed about the patient. The knee-jerks were enfeebled, and neither the Babinski reflex nor Kernig's sign was present, although later Kernig's sign could be elicited. Divergent strabismus developed and the head became retracted, while the patient was exceedingly restless and exhibited subsultus and carphology. On examination of the blood a second time the number of red corpuscles was found to be more than 6,000,000, and the number of colorless cells 17,600 per cubic millimetre. Malarial plasmodia were not present. The urine now contained albumin and also granular and bloody tube-casts. The patient became comatose and gradually weaker, and death ensued on the ninth day after admission.

Post-mortem examination revealed typical intestinal lesions of typhoid fever, namely, enlargement of the spleen and ulceration of the ileum. The brain and the spinal cord exhibited no abnormality except roughening of the membranes covering the inferior aspect of the cerebellum. Inoculations from the brain, the cord, and the spleen failed to yield cultures. The kidneys exhibited a slight degree of inflammation. The liver was pale and friable, and appeared to be in a state of parenchymatous degeneration.

The question may fairly be raised whether the hemorrhagic character in these cases is in any way related to the primary disease. Doubt at once arises from the fact that the complication is so rare, and, further, that it is occasionally observed in connection with other infectious diseases, as well as independently at times. The thought naturally suggests itself that we may have to do with a hemorrhagic purpura occurring in the course of and perhaps predisposed to by the typhoid fever; but even this does not help us greatly, as we are as yet uninformed as to the nature of purpura and as to its etiology and associations.

A STUDY OF CONGENITAL SARCOMA OF THE LIVER AND SUPRARENAL.

WITH REPORT OF A CASE.

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CASE I.—B. L., a female child, was a private patient of Dr. McCreight, to whom, with Dr. J. H. McKee, I am indebted for this history.

Family History. Maternal grandmother died of dropsy, and grandfather of paralysis. Paternal grandmother living and well; the grandfather died suddenly of kidney trouble. The husband was insane seven years ago; was jealous of his wife; has not, however, been violent since, although occasionally has visual hallucinations. He denies any syphilitic infection. The mother suffers only from indigestion; has had seven children, only one of whom, a six-months baby, has died.

Previous and Present History. Born August 19, 1900. She seemed perfectly well until September 14th. Mother then noticed protruding navel. The next day the abdomen appeared large and shiny. Since then the abdomen has grown rapidly. The baby has lost some flesh and drinks a great deal. No appreciable fever. Bowels are loose and green in color. She seems to have some colic at times. Dr. McCreight first saw the child when it was four weeks old, and states that the abdomen increased visibly from day to day until death.

At an examination made on September 27th, when the child was five weeks old, the following notes were made:

Inspection. Much distended abdomen, almost symmetrical in character. Pouting umbilicus. Enlarged superficial veins. Marked bulging in both lumbar regions posteriorly, but especially on the right side.

Palpation. The abdomen is very tense anteriorly, and from the costal border to about one inch below the umbilicus in the median line gives the sensation of a firm, heavy, resistant growth. Below this point there is gurgling in the bowel on pressure. In the right iliac fossa the growth fills the whole area. Palpation readily indicates a sharp border, almost unquestionably liver, and slightly to the left of the umbilicus is found a distinct notch. This border dips deeply into the right iliac fossa. The mass is lifted markedly by deep pressure in either renal region, but the greatest sense of resistance is experienced in the right lumbar region posteriorly.

Percussion. The hepatic dulness does not extend above the level of the right costal border anteriorly. From the border down to below the umbilicus in the median line, and almost to Poupart's ligament in the right iliac fossa, there is absolute flatness. Posteriorly in the prone position there is absolute flatness in the right lumbar region and colic tympany over the left side.

The child died in convulsions on October 3, 1900, aged six and a half weeks. It had nursed until the last day. The body had wasted but

very little, and the abdomen had grown so tense that the skin could not be pinched between the fingers.   A few small hemorrhagic petechiæ had formed in either lumbar region a few days before death.

Post-mortem was performed by Dr. J. C. Gittings, at that time pathologist to St. Christopher's Hospital.   The specimens were given to me for examination, as Dr. Gittings left the city in a few days.

Fig. 1.

From a photograph taken after death.

Body of a female infant, aged six and a half weeks.   Well nourished ; no eruption ; no excoriation or redness around mouth, nose, or anus ; no jaundice ; no enlarged lymphatics.   Protruding abdomen, with pouting umbilicus.   The abdomen was completely filled by the liver, which was seen to be much enlarged and bulged out below the costal margin and extended down almost to the symphysis.   A minute

Fig. 2.

Appearance of the surface of a fresh section of the liver.

quantity of serous fluid free in the peritoneal cavity.   Lungs crepitant throughout, but congested.   Heart normal.   Spleen small, dark brown, and soft.   Kidneys normal.   Left suprarenal normal.   Right suprarenal enlarged to the size of an English walnut, firm, and hemorrhagic in appearance.   On section the surface presented a yellowish-white, homogeneous character, with scattered areas of hemorrhage.   There

were no abnormal adhesions. The liver weighed two pounds and eight ounces; was uniformly enlarged in all its lobes; no irregularities or

FIG. 3.
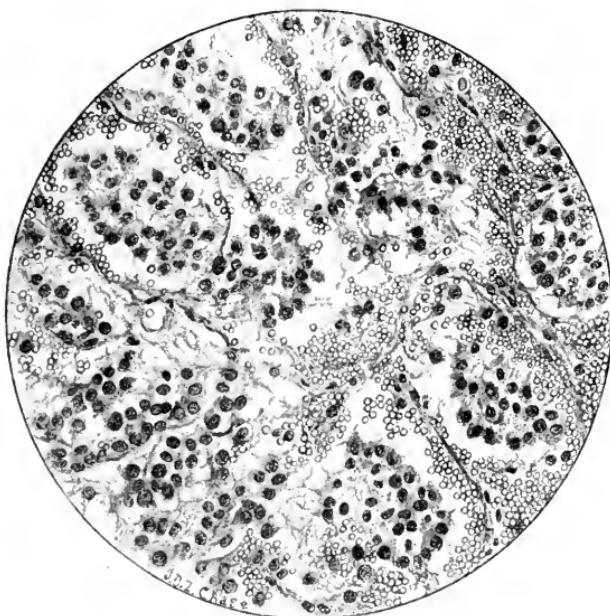
Section of suprarenal body.

FIG. 4.
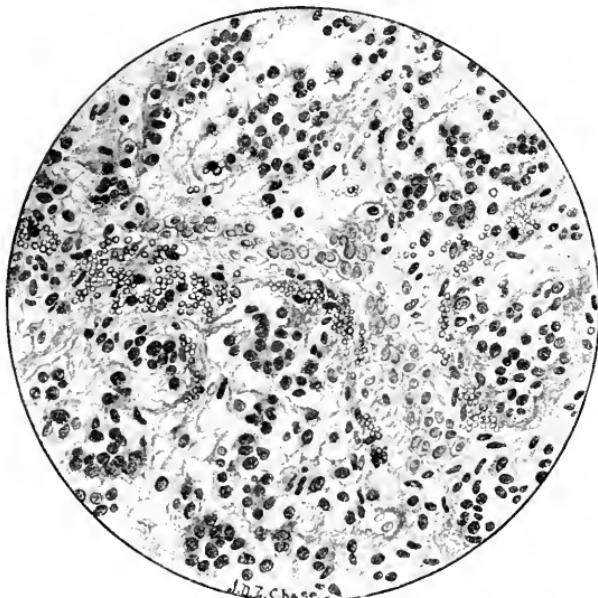
Section of liver, showing infiltrating tumor cells and a band of compressed liver cells.

nodules. The increasing convexity of the right lobe had caused the liver to slip out from beneath the costal margin. The capsule was

smooth and glistening, with reddish and yellowish areas, giving it a mottled or marbled appearance. On section it presented a uniform yellowish-white appearance with small, hemorrhagic areas, and resembled the growth in the suprarenal, though it was not so distinctly hemorrhagic. The appearance suggested a diffuse neoplastic infiltration or a massive transformation. It was with difficulty that one could find any normal hepatic tissue showing acini. There were a few enlarged mesenteric glands, but these were not the seat of any growth.

Microscopical examination was made of sections from lungs, spleen, kidneys, and lymphatic glands, all of which were normal. The study of sections from the growth in the right suprarenal showed that there was still a remnant of the gland left at the periphery of the mass. The tumor was a typical lymphosarcoma, and, stained with van Giesen's method, showed a small amount of fibrous connective tissue in an alveolar arrangement, filled with masses of loosely packed, round, lymphoid cells, about twice the size of a red corpuscle. The growth was very hemorrhagic, and the blood was not confined to the vessels, but was free throughout the tissue. Sections from various portions of the liver showed the same lymphosarcomatous growth, though less hemorrhagic, and in places small islets of liver cells surrounded and infiltrated by the growth or compressed and squeezed into narrow bands. In no place could a typical secondary nodule be found surrounded by liver tissue, because the remnants of liver structure were so small and so surrounded by the growth that such a condition was impossible. The amount of fibrous connective tissue was not prominent in any portion of the tumor, being always subordinate to the number of lymphoid cells.

A very careful review of the literature upon the subject of primary sarcoma of the suprarenal and of the same in the liver was intensely interesting, because I found five cases of such striking similarity to the one I have just reported that I have thought it important to abstract them quite fully, to show that we have here a special type of congenital malignant disease, with its own peculiar symptoms and pathological findings.

CASE II. *Congenital round-celled sarcoma of the liver.*—George Heaton (*Transactions of the Pathological Society of London*, 1897–98, vol. xlix., p. 140). The patient, a girl, aged eight weeks, was admitted into the Children's Hospital, Birmingham, with a history of rapid abdominal enlargement, with general wasting. The abdomen was noticed at birth to be unduly prominent, and this prominence increased rapidly until admission a few days before death. During a week while the child was under observation the abdomen increased in circumference one and a half inches. It was distended by a tumor occupying the epigastric, the right and left hypochondriac regions, descending downward below the umbilicus. The tumor had the characteristic signs of an enlarged liver. There was no jaundice and no ascites. The mother and father were in every way healthy. There were two other children alive and well. There was no evidence whatever of any syphilitic taint. The child sank gradually, and died aged nine weeks.

Post-mortem Examination. There was much general wasting of the body. The abdomen was distended by a uniform swelling occupying

the position of the liver and extending considerably below the level of the umbilicus. The spleen was of average size and showed no lesion. The kidneys were anæmic. There was no enlargement of any of the abdominal lymphatic glands nor any evidence of old or recent peritonitis. The right suprarenal capsule was enlarged by a nodule about the size of a marble, occupying its posterior half. On section it was dark red. The left suprarenal capsule showed no abnormality. The liver was greatly enlarged and weighed forty-nine ounces. The enlargement was uniform, all its lobes being equally affected. The surface was smooth and glistening, the peritoneal coat being normal in appearance, and there was no thickening of the capsule. In the fresh state the surface had a most peculiar mottled or marbled appearance, being covered with numerous red patches, separated from one another by pale, dull areas. A section of the liver presented the same appearance. There were numerous patches of a dark red color surrounded by zones of a lighter color. The gall-bladder was contracted and empty. The sulcus in which it lay did not nearly reach the free margin of the organ, indicating a rapid enlargement of the organ in a downward direction. Microscopical examination of the enlarged liver showed: 1. Areas in which there was considerable vascular enlargement corresponding to the dark red patches seen with the naked eye. 2. Liver cells showing apparently no change. 3. Areas of small cell growth corresponding to the pale patches seen by the naked eye. These areas contained large numbers of round cells, fairly uniform in size and rather densely packed together. At the margin of these areas the cells were seen infiltrating between the liver cells, even extending some distance away from the main collection. Where this infiltration was taking place the liver cells showed a considerable amount of alteration, being atrophied and in many instances so changed that their distinctive characters were lost, and they appeared as irregular atrophied cells. The organ would, therefore, appear to have been the seat of a diffuse round-cell sarcoma which had begun primarily within its substance during intra-uterine life and caused a rapid, uniform enlargement, with partial disappearance and destruction of the liver cells. The diagnosis of sarcoma is supported by the great and rapid enlargement of the organ, the absence of any enlargement of the spleen or lymphatic glands, and the presence of a secondary nodule of an exactly similar character in the right suprarenal body.

CASE III. *Sarcoma of suprarenal capsules in a child, aged seven weeks.* —John Orr (*Edinburgh Medical Journal*, September, 1900) reports the case of a female child, aged seven weeks, brought to the dispensary on account of "swelling of the belly." The history given was that the infant was born at term at a maternity hospital, apparently normal, and no evidence of disease detected by the physician in charge. A fortnight before the child came under Dr. Orr's care the mother had noticed that the abdomen was unduly prominent and was increasing gradually. The child otherwise seemed well and took nourishment naturally. It was the youngest of a family of eight, who, except the fourth, an imbecile, were born healthy and have remained so. The only constitutional taint on either side of the family was an old tubercular knee-joint of the father. The child suffered no pain, and was well nourished and showed no discoloration or pigmentation of the skin. On examination the following was noted : The superficial abdominal

veins were distended, especially in the upper part.   Palpation over the distended upper abdomen revealed what was taken to be an enlarged liver and spleen, extending to a little below the umbilicus.   Both these swellings were perfectly smooth and uniform.   Circumference just above the navel, the most prominent part, was seventeen and one-half inches.   No glandular enlargements.   The blood showed at first a leucocytosis, which later disappeared.   The child lost weight and the abdomen increased in girth, and the two areas of enlargement and dulness descended into the right and left iliac fossæ respectively.   The circumference became nineteen and one-half inches.   The child weighed eleven pounds and three ounces.   Death occurred nine weeks after the case came under Dr. Orr's care, the child then being four months old. Various diagnoses were discussed.   The post-mortem showed, however, that the supposed enlarged spleen was an enlarged left lobe of the liver and that the spleen was normal.   The enormous hepatic enlargement was sarcomatous, and the primary seat was in the right suprarenal. Both lobes of the liver were uniformly enlarged.   The surface was perfectly smooth, but showed shining through its capsule, which was in no way thickened, a large number of small, white areas, mostly circular, though occasionally irregular, from confluence.   The liver weighed just under three pounds.   On section these nodules were still more evident. They were of a whitish or yellowish-white color, with hemorrhagic foci here and there.   They infiltrated the liver everywhere.   All the other organs were healthy except the two suprarenal bodies.   In place of the right one there was a large growth, weight seven ounces, which almost hid the kidney from view.   The growth was roughly globular, and was surrounded by a firm, fibrous capsule, and there were no firm adhesions. It was soft, of a dark red color like a blood clot, and was spotted with white.   It showed no recognizable suprarenal tissue.   The left suprarenal had preserved its shape, though enlarged and infiltrated with whitish-yellow nodules of secondary growth.   Microscopical examination of pieces of the primary and secondary growths was made, and it was found to be mainly a cellular growth, the cells being chiefly round and averaging from 8 to 10 mm. in diameter, each with a large, deeply staining nucleus and a comparatively thin rim of protoplasm.   It was highly vascular.   In some few places it was more fibrous, probably older areas.   In the latter the fibrous tissue was collected in fairly well-formed alveoli in which the cells lay.   Orr calls attention to the peculiarly smooth, uniform character of the secondary hepatic enlargement.

CASE IV. *Diffuse sarcoma of the liver, probably congenital.*—R. W. Parker (*Transactions of the Pathological Society of London,* 1880, vol. xxxi.) reports a case of a female child, seen at the age of three weeks on account of swelling and hardness of the abdomen.   There had been no jaundice.   The child was emaciated, the abdomen distended and in the region of the liver uneven, and there were a few enlarged veins ramifying over it.   A hard mass was felt extending from one side to the other and down to the iliac crests.   Mercurial inunctions failed to produce any improvement.   The child died at the age of five weeks. A partial autopsy was made.   Body was much emaciated.   Bones appeared normal.   Liver filled the abdominal cavity almost entirely. Weighed thirty-two ounces.   When first removed it was of a dark plum color, mottled over with patches of a yellowish tint, corresponding, when cut into, to a new growth, which was largely diffused through the

whole liver. This dark color quickly changed to a bright scarlet after removal of the liver from the body. It was obviously due to the presence of blood, with which the organ was distended. The new growth was scattered throughout the entire gland as nodules varying in size from a millet-seed to a walnut. It looked not unlike caseous material, but it could not be shelled out from the liver substance. The surface of the organ was slightly nodulated, its capsule shiny and not thickened. Left lobe was as large as the right. From the lower surface several nodules projected. Gall-bladder rudimentary, kidneys normal, also spleen. There was a mass of new growth between the spleen and left kidney as large as a Tangiers orange. This was the only secondary growth; it was very vascular and soft. Microscopical examination of the liver tumor showed that it was mainly composed of round cells, larger than red blood-corpuscles. The proper gland cells of the liver could not be found in the many sections examined. Even in places where there was no obvious naked-eye change the liver substance was infiltrated with a dense, small cell deposit which quite obscured the liver cells even if they were present. Some areas showed extravasated blood. At the periphery there was an abortive appearance of portal zones. Dr. Parker called this growth a congenital round-celled sarcoma, and rejected the possibility of its being syphilitic.

CASE V. *Congenital tumor of the liver and both suprarenals.*—De Ruyter (*Langenbeck's Archives*, 1890, vol. xl., p. 98) reports the case of a infant whose parents noticed almost immediately after its birth that the abdomen was enlarged and that it was increasing in size from day to day. On the fifth day the child was brought to the clinic; it showed then no abnormalities except enormous distention of the abdomen. Congestion of the veins over this area was marked. The greatest circumference was in the neighborhood of the navel, and was 55 cm. Palpation revealed throughout the whole abdomen an equally elastic resistance. This mass was everywhere smooth and free from inequalities. *Clinical diagnosis.* Suprarenal tumor. For three days the child took a fair quantity of milk, but on the fourth and fifth days refused nourishment. The breathing became more superficial on account of increase in the size of the abdomen. Extensive cyanosis appeared and death followed. *Post-mortem.* Emaciation quite advanced. On opening the abdomen all the organs were hidden by a tumor extending from the costal border to the symphysis. This tumor had preserved the exact form of the liver in which it had developed. The surface was smooth, without any depressions or elevations. There were no adhesions. Spleen normal in size and structure. Occupying the position of the left suprarenal was found a tumor the size of an apple adherent to the kidney, although easily separated from it. Both kidneys were normal. Section of the left suprarenal tumor showed alternate darker and lighter layers. Macroscopically nothing of the suprarenal tissue could be seen. The right suprarenal was half as large as the left and very hemorrhagic. The liver, or, more properly speaking, the liver tumor, was 20 cm. broad, 12.5 cm. high, and 6.5 cm. thick. The whole organ was enlarged proportionately. The capsule was moist, smooth, and glistening, and through it shone a yellow, speckled, brownish-red tissue. The gall-bladder, having retained its normal size, was fully covered by the growth of the right lobe. Section through the liver tumor showed it to be very rich in blood, and that it was made up of a partly yellowish and partly

grayish-red marbled tissue of such indistinct composition that the acinous liver tissue could be no longer detected. Microscopical examination of the liver tumor showed that of the original liver tissue practically nothing remained, but in its place throughout the whole mass was a structure composed of an alveolar framework of connective tissue filled with round cells. The connective tissue was rich in bloodvessels. In a few places were some irregular shaped multinucleated cells, which were thought to have been remnants of the old liver cells. Section of the left suprarenal tumor showed the same condition, except that in one part the cortex of the old suprarenal was still present. The right suprarenal was also involved in the same manner, but was much more hemorrhagic; in fact, a telangiectatic condition was present. Dr. O. Israel examined sections microscopically from the liver tumor and the suprarenals, and diagnosed those from the liver and right suprarenal as congenital lymphosarcoma and those from the left suprarenal as hemorrhagic telangiectic lymphosarcoma.

CASE. VI. *Myxosarcoma of the liver in an infant aged four months.*—Meisenbach (*Weekly Medical Review*, St. Louis, 1884, ix., 433). Female child, apparently normal at birth. About two weeks later the mother noticed a swollen condition of the abdomen, and the navel protruded, teat-like. There is no history of any specific disease. Dr. M. saw the child at the age of eleven weeks. Restless, vomited milk, but nursed pretty well. Abdomen excessively and symmetrically enlarged; the abdominal veins congested, navel protruding. Percussion gave complete dulness extending from the xiphoid cartilage downward into the hypogastric regions, and latterly posteriorly into the lumbar and iliac regions. Palpation detected a firm, smooth, resisting mass filling the entire abdominal cavity, with the exception of a small space in the hypogastric region, where, on deep pressure, the free margin of a firm body could be felt. The child was put on antisyphilitic treatment, with apparently slight decrease in the size of the liver. Died aged sixteen weeks. Abdomen was seventeen inches in circumference. Navel protruding, but flabby. Small amount of fluid in the abdominal cavity. Liver enlarged, filling entire abdominal cavity, bulging up under the xiphoid cartilage, with inferior margin in the hypogastric region. Liver presented smooth, symmetrical enlargement, color mottled, like red castile soap. Spleen and kidneys normal in size, but also mottled.

There is a remarkable resemblance between these six cases, and in order to make this more apparent I shall tabulate the points of similarity.

1. The age at which the first symptom—swelling of the abdomen—was observed was: In Case II. at birth; in Case V. almost immediately after birth; in Case VI. two weeks; in Case IV. three weeks; in Case I. between three and four weeks, and in Case III. five weeks. This seems to prove that these six cases were certainly all congenital, especially when the extensive involvement of the liver is considered.

2. The age at which the children died was as follows: Case V. lived ten days; Case IV. lived five weeks; Case I. lived six weeks; Case II. lived nine weeks, and Case III. and Case VI. lived sixteen weeks. This shows the great malignancy of these growths.

3. The rapidity of growth of these tumors is shown by the fact that in Case V. a difference could be noted from day to day, and the cir-

cumference reached 21.7 inches. Case II. grew rapidly until it came under close observation, and then in one week the abdomen increased one and a half inches; the liver weighed forty-nine ounces. Case I. grew very rapidly, and the liver weighed forty ounces. Case III. grew more gradually, and while under observation increased two inches in nine weeks, and the liver weighed forty-eight ounces. In Case IV. it is not stated how rapidly the abdomen increased, but the liver weighed thirty-two ounces. In Case VI. it is supposed to have decreased slightly, but at death the abdomen measured seventeen inches. .

4. The sex of Case V. is not mentioned; all the others were females.

5. Clinical symptoms: Distention of the abdomen was present in all. Wasting was present in varying degrees, although it does not seem to have been as extreme as one might have supposed would have occurred. Ascites is not noted in any case, nor is jaundice or any form of pigmentation of the skin. The children all nursed well until shortly before death. There does not seem to have been much pain, nor is there any mention of a rise of temperature. There was no syphilitic history in any of them, nor were any signs of syphilis found.

6. The growth in the liver in these cases was identical in its appearance and showed the same equally infiltrative proliferation by the sarcomatous tissue, with practically complete destruction of the entire normal liver structure.

7. The growth in the suprarenals exhibited the peculiarity of being very hemorrhagic. In Case II. there was a nodule the size of a marble in the posterior half of the gland. In Case III. there was a mass the size of an apple in the right, and none of the normal tissue remained. The left was also enlarged and infiltrated with small nodules. In Case V. the left was replaced by a tumor the size of an apple, with complete destruction of normal tissue, and the right was half as large. In Case I. the right was as large as a walnut, and the cortical layer of the suprarenal gland still remained around the periphery of the growth. In Case IV. there was a mass of new growth lying between the spleen and the left kidney. (May this not have been the left suprarenal gland, especially since the autopsy is described as being only partial and the suprarenals are not even mentioned?) In Case VI. the suprarenals are also not mentioned. This case is, however, not very fully reported.

8. In all these cases no other organ or part of the body was involved by the new growth.

9. The pathological diagnosis in Case IV. was round-celled sarcoma, the same in Case II. and Case III. In Case VI. myxosarcoma; in Case V. lymphosarcoma, and also in Case I.

10. The primary seat was thought in Cases II., IV., and VI. to have been the liver. In Cases I. and III. the right suprarenal; in Case V. it was simply called a sarcoma of the liver and both suprarenals.

11. The absence of the following points in these cases differentiates them from a possible syphilitc affection of the liver and suprarenals: *a.* There was no overgrowth of connective tissue in any of the tumor masses. *b.* There was no amyloid change in any organ. *c.* There was no perihepatitis. *d.* There was no jaundice. *e.* There was no enlargement of the spleen. *f.* There was very little if any pain in the neighborhood of the liver. *g.* There was no nephritis. *h.* The markedly hemorrhagic condition of the tumors.

These six cases, beside showing such a similarity to one another, have another point of interest, namely, they are so dissimilar to all other reported cases of either primary sarcoma of the suprarenals or of the liver that I have tabulated forty-six cases of primary sarcoma of the suprarenal in addition to those abstracted above, which I have found in a thorough search through the literature. These cases occur in various periods of life. The earliest are one by Cohn, in a nine months' old girl, with a large growth in the left suprarenal and metastases in the skull, kidney, liver, ovary, and ribs; one by Pitt, in a ten months' old boy, with a tumor the size of a hen's egg in the right suprarenal, and a large nodule in the liver, which may have been the primary seat; one by Caillé, in an infant with a tumor in the left suprarenal and a diffuse secondary growth in the neighborhood of the third cervical vertebra; one by Dobbertin in a fourteen months' old girl, who had a growth in the abdomen since birth; an operation was performed, and the left kidney together with the growth were removed together. The diagnosis of sarcoma was not certain, however.

From these cases occurring in infancy others are found up to the two oldest, both sixty-eight years. None of these cases show this infiltrating character of the growth which was so characteristic of the cases that I have abstracted above in full, nor did any of them present the same clinical picture.

In looking over the literature of primary sarcoma of the liver I find few cases, and a number of these are rather doubtful. Among these cases the earliest was one reported by Pepper before the Pathological Society of Philadelphia, in 1873, as a case of primary carcinoma in a child, aged eight weeks. This case was quoted by Arnold and Birch-Hirschfeld as presumably a sarcoma. The growth was a circumscribed nodule in the left lobe of the liver. Gee (*St. Bartholomew's Hospital Reports*, 1873, vol. vii.) reports an early case in a child, aged five months, with countless nodules in the liver. West, quoted by Birch-Hirschfeld, reports another in a boy, aged nine months, with a tumor in the liver and metastases in the lung. Arnold and Birch-Hirschfeld also believe these to be sarcomas. Von Windrath (*Inaug. Dissert.*, Freiburg) reports another case occurring the first year of life, in which the liver, the only organ involved, was the seat of numerous various sized nodules, which were, however, sharply separated from the surrounding tissue.

Primary Sarcoma of the Suprarenal Gland.

No.	Sex and age.	Reference.	Clinical course.	Suprarenal; size, etc.	Metastases.	Variety of sarcoma.
1	Ermi quotes Doderlein M. 47	Dissertation, Erlangen, 1860.	Skin gray; icteric, abdominal tumor.	Right, man's head.	None.	Sarcoma.
2	Kussmaul M. 47	Wurz. med. Zeitschr., 1863, No. 24.	Cachexia, slightly icteric, mass felt in right hypochondrium.	Right, man's head.	None; only adhesions.	Melanotic sarcoma.
3	Greenhow F. 12	Trans. Path. Soc. London, 1867, xviii.	No pain or wasting; pneumonia; no pigment.	3×2 in.	None.	Sarcoma.
4	Coats F. ...	Virchow, Hirsch. Jahr., 1872, i. p. 244.	....	Left, 18 lbs.	None.	Round & spindle-celled.
5	Eberth F. 1⁵/₁₂	Virchow's Arch., 1872, lv. p. 518.	Mass felt in abdomen; ascites; diarrhœa.	Right.	Left kidney, peritoneum, and diaphragm.	Myosarcoma.
6	Smith M. old man.	Dublin Journ. Med. Sci., 1877, lxiv. p. 555.	No pigment.	Right, 8×3½ in.	None.	Cystic sarcoma, round and spindle-cell.
7	West M. 57	Path. Soc. Lond., 1878-79, vol. xxx.	Bloody sputum; wasting; no discolorat'n of skin; dulness over right lung.	Right, 5×4½×3 in.	Lung and bronchial glands.	Sarcoma.
8	Merkel M. ...	Ziemssen's Handb. Spec. Path. u. Ther., 1875-80, Bd. viii. 2d half, p. 301.	Skin faint brown.	....	No secondary.	Sarcoma.
9	Rosenstein M. 40	Virchow's Archiv, 1881, Bd. lxxxiv.	Pain; loss of appetite; tumor felt; urine normal.	Left, large.	Right suprarenal, kidney, pancreas, heart.	Small-cell sarcoma.
10	Fox F. 2	Trans. Path. Soc. London, vol. xxxvi. 1885.	Rickety; dusky skin; hairy; abdomen enlarged gradually.	Left, cocoanut.	Lung.	Large-cell sarcoma.
11	Turner M. 25	Ibid.	Horseshoe kidney.	Both.	Mediastinum involving lung.	Round-cell sarcoma.
12	White ...	Ibid., p. 464.	No pigmentation.	Left.	None.	Sarcoma.
13	Fränkel F. 18	Virchow's Archiv., 1886, Bd. ciii. p. 244.	No pigment; nephritis; retinitis.	Left, fist; right, hazelnut.	In right suprarenal.	Angiosarcoma.
14	Gade M. 4	Förd, Norske med. Salsk. Kristiania, 1886.	Pain, emaciation, and abdominal tumor.	Both, in one mass, child's head.	Liver.	Round-cell sarcoma.
15	" M. 6	Ibid.	Supposed to have psoitis or spondilitis.	Right, child's head.	Liver and right lung.	Round-cell sarcoma.
16	Perry M. 23	British Med. Journ.,1888,vol. i. p. 1382.	Symptoms resembled Addison's disease.	Both, R. ¼ oz., L. 1 oz.	None.	Spindle-cell sarcoma.
17	Blackburn M. 48	Journ. Amer. Med. Assoc., 1888, vol. x.	Chronic mania; pain; anæmia; not diagnosed.	Right, 97¼ oz., 8⅝×5⅞.	No secondary nodules adherent to adjacent organs.	Large-celled, round-cell sarcoma, cystic.
18	Pilliet M. 56	Bull. de la Soc. Anatomique de Paris, 1888, p. 716.	Œdema; exhaustion.	Right, 25×20 cent.	Inferior vena cava, right auricle.	Sarcoma.
19	Griffiths M. 41	British Med. Journ., Feb., 1889.	3 months sick; gangrene of left foot.	Both, 2×½	None.	Sarcoma.
20	Berdach M. 55	Wien. med. Wochensch., 1889, xxxix.	Tumor felt, also superficial nodules; pain; skin slightly brown.	Left.	Liver, stomach by continuity, skin.	Small-celled, spindle-cell sarcoma.

No.		Sex and age.	Reference.	Clinical course.	Supra-renal; size, etc.	Metastases.	Variety of sarcoma.
21	De Paoli	M. adult	Per l XXV anno del insegnamento Chirurgico de Francesco Durante, 1889, i. 219.	Operation performed.	Right, man's head.	Liver, spleen, left supra-renal, kidney.	Sarcoma.
22	De Paoli	M. adult	Ibid.	Dyspnœa; sub-icteric.	Left, fœtal head.	Liver and lung.	Angio-sarcoma.
23	Orth	F. 58	Arbeiten aus dem path. Institut In Göttingen. R. Virchow., 50 z. Jubiläum, 1895.	....	Left, fist.	Kidney, right supra-renal, pia mater, brain, lungs, liver, intestine, lymphatics.	Melan-sarcoma.
24	Lazarus	... 3½	Med. Press and Circ., London, May, 1894.	Pain; swelling; mass in abdomen, emaciation, while weight increases.	Left, 12 lbs.; child 37 lbs.	None.	Sarcoma.
25	Jores	M. 30	Deutsch. med. Wochenschr., 1894, xx.	Paralytic; no bronzing.	Both, L. fist; R. hen egg.	Brain, kidney, perito-neum, me-diastinum, pericardium, pancreas.	Short, small, spindle-cell sarcoma.
26	Earl and Weaver	M. 3	Journ. Amer. Med. Assoc., Dec., 1894.	Jaundice; emaciation; rapid increase in size of liver, with improvement, followed by relapses; obliteration of gall-duct.	Right.	None.	Mixed-cell sarcoma.
27*	Cohn	F. 9 mo.	Berl. klin. Wochensch., 1894, p. 266.	Secondary growth in temporal region; mass felt in abdomen.	Left, 13×5×8 c.m.	Skull, kidney, liver, ovary, ribs.	Round-celled sarcoma, cystic.
28	Drozda	M. 68	Jahrb. Wien., k. u. k. Krankenast, 1895, iv. p. 327.	Mass in abdomen.	Left.	Vena cava.	Sarcoma.
29	Lütke-müller	F. 33	Ibid., p. 207.	Weakness, vomiting, emaciation; skin gray-yellow with tinge of brown; black spots on gums.	Both, 5 c.m.× 3.5×1.5	Retroperito-neal glands and mesenteric glands.	Lympho-sarcoma.
30	Caillé	... infant.	Archiv. Pediat., Aug., 1895.	Moribund when seen.	Left.	3d cervical vertebra, diffuse growth.	Round-celled sarcoma, cystic.
31	Affleck and Leith	M. 46	Edinb. Hosp. Rep., 1896, vol. iv.	No pigment; no tumor felt.	Right, 5×4×3in.	Liver, left suprarenal, stomach, pleura, ribs, lymphatics.	Mixed or irregular celled.
32	Affleck and Leith	M. 31	Ibid.	....	Right, with liver 20 lbs. 4 oz.	Liver, kidney.	Small round-cell.
33	Affleck and Leith	F. 50	Ibid.	....	Left, 5×4×3 inches.	Continuous, with huge retroperito-neal growth 35½ lbs.	Cystic sarcoma.
34	Pitt	M. 10 mo	Trans. Path. Soc. London, 1897–1898, xlix.	Jaundice; waisting.	Right, hen egg.	May have started in liver.	Small round-cell.
35	Rolleston and Marks	M. 25	Amer. Journ. Med. Sci., Oct., 1898.	Diagnosis: hydatid of liver; no pigment.	Right.	Aortic lymphatic glands, invaded renal vein, liver, and kidney.	Mixed-cell sarcoma.

No.		Sex and age.	Reference.	Clinical course.	Supra-renal; size, etc.	Metastases.	Variety of sarcoma.
36	Rolleston and Marks, shown by Dickinson to Path.Soc. Lond., 1894	M. 57	Amer. Journ. Med. Sci., Oct., 1893.	Hæmaturia and renal tumor for 8 years; resembled Addison's dis.; pigmentation of axillæ, nipples, and body.	Right, with kidney size of man's head.	Pleura and lungs, liver, extending into vena cava, spleen.	Mixed-cell sarcoma.
37	"	F. 38	Ibid.	No jaundice; œdema of legs; inf. vena cava blocked.	Right.	Liver.	Round-cell sarcoma, hemorrh'ge
38	"	F. 55	Ibid.	No jaundice.	....	Bronchial glands.	Large-cell sarcoma.
39	"	M. 8¾	Ibid.	No jaundice; cerebral symptoms.	Left.	Brain.	Sarcoma.
40	" Muir	M. 31	Ibid.	No pigment.	Right.	Invading liver and kidneys.	Small round cystic sarcoma.
41	"	F. 50	Ibid.	No pigment.	Left.	Large retro-peritoneal tumor, 36½ lbs.	Cystic sarcoma.
42	Finny	M. 66	Dublin Journ. Med. Sci., Nov. 1899.	Skin darker than normal; left lung dull; no fluid on tapping; urine normal.	Left, fœtal head.	Right supra and lung, size of pullet's egg.	Mixed-cell sarcoma, giant cells.
43	Brüchanow	F. 32	Zeitschrift für Heilkunde, 1899, vol. xx.	Operated on for supposed subphrenic abscess.	Right, 18 cm. in diameter.	None.	Fibromyxo-sarcoma.
44	"	F. 58	Ibid.	Abdominal tum., explor. puncture.	Left, man's head.	Few on greater curvature of stomach.	Spindle-cell sarcoma.
45	"	M. 68	Ibid.	Ascites.	Right, 5 cm. in diameter.	None.	Angio-sarcoma.
46	Dobbertin	F. 14 mo	Beitr. z. path. Anat. u. z. allg. Path., xxvili. p. 60.	Very hairy child.	Left, child's fist.	Mediastinal and mesenteric glands.	Sarcoma (?)

A CASE OF SARCOMA OF THE THIGH, FOR WHICH DISARTICULATION WAS PERFORMED THROUGH THE HIP-JOINT, WITH THE FORMATION OF A POSTERIOR FLAP.[1]

By JOHN CHALMERS DA COSTA, M.D.,
OF PHILADELPHIA.

I MAKE this report fully recognizing the fact that disarticulation at the hip-joint is no longer a novel or even a notable operation, but in this particular case there were obstacles to the prevention of hemorrhage by any of the usual plans, and also to the removal of the extremity by any of the accepted incisions. Because of these obstacles and the manner in which they were overcome it seems proper to make a report.

[1] Read before the College of Physicians of Philadelphia.

The patient, M. K., was a girl, aged fifteen years. The family history, so far as known, offered no fact bearing upon the cause of her disease. She had received no injury of any sort. Four months previous to her admission into the Hospital of the Jefferson Medical College she observed a hard, movable, and tender lump on the front of the upper portion of the right thigh. The lump was about the size of a hickory-nut, and seemed to be just beneath the skin. Iodine and other drugs were applied locally, but without avail. The tumor continued to enlarge rapidly, and in the course of a month attained the size of a hen's egg. From this time on the tumor grew with great rapidity, and upon admission into the hospital it had reached the dimensions shown in Fig. 1. Five weeks before her entrance into the hospital the skin over the tumor gave way in several places, and through these openings fungation occurred—a condition which was accompanied by an abundant flow of thin, reddish discharge. The patient's condi-

Fig. 1.

tion grew steadily worse, and when Dr. Keen and I saw her for the first time, on January 3, 1900, blood was oozing freely from the fungating masses.

CONDITION ON ADMISSION. The heart and lungs were found to be normal. The urine was acid, free from casts, albumin, and sugar ; of a specific gravity of 1018, and contained 1.3 per cent. of urea. The girl was pallid and somewhat weak, and her family stated that she had lost some flesh, but not a great deal. The amount of hæmoglobin was 60 per cent.

On the upper and anterior portion of the thigh a somewhat conical mass about the size of a cocoanut was observed. The mass was firm, immovable, and extended laterally beyond the obvious outline as gauged by the eye. It also extended inward and seemed to have deep attachments. The limits of the tumor from above downward, estimated by palpation, were from the middle of the anterior portion of the thigh to two finger-breadths below Poupart's ligament ; laterally it occupied

almost half of the circumference of the thigh.   Just above Poupart's ligament an enlarged gland could be distinctly detected.   The gland was hard, immovable, placed above the muscle, and unconnected with the skin.   The skin at the summit of the main mass had been destroyed, and the tumor was fungating, and blood was oozing freely.   The skin over a considerable portion of the tumor was of a deep, purple-blue color, and at a number of points it was thin and knobby where additional fungation was about to occur.   This discoloration of the skin was apparently congestive.   Above Poupart's ligament and for several inches below it the skin was free from growth and appeared normal. It was impossible to detect any enlargement of the iliac glands.   The growth was obviously a small-celled sarcoma, which had started superficially and grown in all directions, and which was accompanied by enlargement of some of the superficial glands above Poupart's ligament.   The nature of the glandular enlargement was uncertain.

From what structure the sarcoma had originated was problematical, but it seemed probable that the growth had begun in the subcutaneous tissues.

On January 5th, two days after admission to the hospital, the bleeding became distinctly worse.   Blood was found to be dripping steadily, and we feared the onset of a furious hemorrhage.   Dr. Keen and I discussed the following problems :

1. Shall any operation be performed ?

2. If disarticulation is decided upon, how shall hemorrhage during its performance be prevented ?

3. If disarticulation be decided upon, how shall the flaps be fashioned ?

Question 1.   The obvious tumor above Poupart's ligament, supposing the involvement to be malignant, made it certain that the complete removal would be difficult and probably impossible ; but there was a small chance that it might be accomplished.   Without operation there was no possible chance for life, and early death was inevitable ; with operation there was a slender chance that the girl might be saved.   The convincing argument in favor of operation was the ominous bleeding, which increased daily in amount and threatened to become uncontrollable.   We, therefore, decided to operate.

Question 2.   The method to be used to prevent hemorrhage during the operation was carefully considered.   No form of elastic constriction about the thigh was admissible, because the incisions would have to be carried through and above the region compressed by the band ; we rejected the pins of Wyeth, the clamp of F. Tilden Brown, and the method of the elder Senn.   The lever of Davy was not considered, because we regarded it as uncertain and as apt to become displaced, and because we thought it likely that it would injure the intestine.   It is well known that Davy's lever is especially liable to damage the gut if applied to the right side.   The abdominal tourniquet was rejected, because we regarded it as uncertain and as apt to injure the intestine.   It became evident that choice must be made between Macewen's method of compressing the aorta with the fist ; Charlot's method of exposing the iliac artery by an extraperitoneal incision and compressing it, and McBurney's method of opening the abdomen, and through this incision compressing the common iliac artery and vein against the psoas muscle. The last mentioned plan, which was devised and first practised by Dr.

Charles McBurney, of New York city, was selected. We regarded it as more certain than any form of aortic compression, more rapid than compression after an extraperitoneal incision, and also more feasible than the latter method, because of the situation of the growth. We decided that the McBurney method would offer a notable advantage—that is, it would permit of an examination of the intra-abdominal structures, and if these were found to be demonstrably involved, we might, if we wished, then and there abandon the operation.

Question 3. The method of making the flaps was easily decided upon. The only region of the limb where sound tissue could be obtained was the posterior portion, hence it was obvious that the flap must be a single posterior one. Furthermore, in order to permit of the removal of enlarged superficial glands it was evident that the anterior incision would have to be so placed as to give access to structures above Poupart's ligament.

The Operation. On January 6th, after the administration of ether, Dr. Hearn opened the abdomen and found that there was no obvious intra-abdominal involvement. The leg and thigh were drained of blood by holding the extremity in a perpendicular position, and Dr. Hearn, with bent fingers, hooked the artery and vein firmly against the psoas muscle. The extremity was then placed in the position requisite for the performance of the operation, after which, assisted by Drs. Keen and Magie, I proceeded to operate.

FIG. 2.

a, b, the anterior incision ; *a, c, d,* the external incision and the beginning of the posterior cut.

The outer posterior and anterior incisions are shown in the diagram. (Fig. 2.) The anterior incision was begun below and external to the anterior superior iliac spine. The incision was carried to Poupart's ligament and along the line of the ligament until it was over the middle of that structure, when it was taken downward and inward to the inside of the thigh and to a point about three inches below the crotch. This incision divided the skin only. The upper margin of the skin flap was dissected upward, and the cellular tissue and glands above Poupart's ligament were dissected from above downward and were left attached to the portion which was to be removed, a little below Poupart's ligament. The femoral artery and vein were exposed below Poupart's ligament, then tied, and divided.

A long posterior flap was marked out by skin incisions, the muscles were divided, the flap was dissected up, and the disarticulation was carried out from in front and was extremely easy. All visible vessels were then ligated and the hæmostasis was absolutely satisfactory. The flap was trimmed to fit, was buttonholed in order to secure posterior drainage, and was sutured in place by silkworm-gut sutures inserted at the skin margins. Two supporting sutures were also used, and were
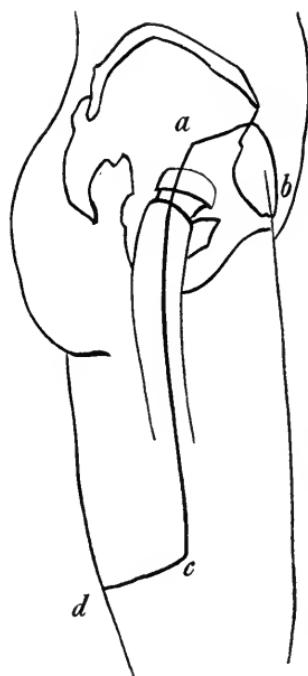
fastened upon perforated lead plates.   The end of a piece of iodoform gauze was carried into the acetabulum, the other end emerging between the flaps ; and a drainage-tube was passed to the depth of the wound, the free end projecting through the buttonhole in the posterior flap.

While the flaps were being sutured Dr. Hearn closed the wound in the belly wall.   During the operation three pints of hot saline fluid were infused into the median basilic vein.   The inner portion of the amputation wound was covered with a thin film of cotton, and several layers of collodion, to prevent contamination with excreta.   The wound in the belly wall was dressed with gauze, held in place by collodion. The stump was dressed with gauze held in place by bandages.

There was very little shock, and the patient reacted quickly and completely.   The recovery from the operation was uneventful ; the highest temperature attained having been 99.5°.   The inner three-quarters of the wound healed by first intention ; the weight of the flap pulled the outer quarter of the wound open.   Two weeks after the operation there was a granulating surface at the outer angle, where the wound had gaped, and a sinus in the lower flap, where the drainage-tube had emerged ; and the patient felt in excellent condition.

Unfortunately, the calm in this case was of brief duration ; six weeks after the operation a suspicious thickening was discovered in the abdominal wall opposite the middle of the scar.   At this point the skin gave way and bleeding began, and on March 1st it was evident that recurrence was rapidly taking place.   The family were informed of the girl's condition, and, no further operation being possible and the patient wishing to be at her home, she left the hospital.   I have not since heard of her, although there can be no doubt that she soon succumbed.

There are a great many methods of performing amputation through the hip-joint.   Joseph Bell, in his *Manual of Surgical Operations*, says that at least twenty-five methods have been put on record, and that, including modifications, there are thirty-seven or thirty-eight surgeons who have each had an individual plan of operating.   He says that the reason of this great complexity is the fact that amputation has usually been performed for cases of severe injury ; that no less grave procedure was possible, and that the flaps had to be made as the surgeon was able to get them.   In the case above reported the making of a posterior flap was looked upon as an unfortunate necessity.   There is a positive disadvantage in this operation—*i. e.*, the flap is extremely heavy and tends to tear the wound open.   If I am ever obliged to perform it again I will put no muscle at all into the flap, and will use at least four button sutures to give support.   It is true that in this operation the femoral vessels can be quickly exposed and easily ligated, and that disarticulation can be readily effected from in front ; but the disadvantages clearly outweigh the advantages, and the operation is justifiable only when it is done as a matter of necessity.   I cannot speak too highly of the perfection of the hæmostasis by McBurney's method.

Dr. Coplin reports that the growth is a small-celled sarcoma ; that the muscles are infiltrated, and that the bone is free from disease.   The

gland was, unfortunately, separated from the specimen and lost; and, therefore, I do not know whether it was or was not malignant. In a non-melanotic sarcoma of the thigh glandular involvement is not common, and yet we know that it may occur. It is quite certain that sarcomatous elements were lodged above Poupart's ligament; were not removed by operation, and grew with great rapidity after the operation had been performed.

STEREOAGNOSIS AND ALLIED CONDITIONS.[1]

By Charles W. Burr, M.D.,
NEUROLOGIST TO THE PHILADELPHIA HOSPITAL.

Recent writers have defined stereognosis as the faculty of recognizing the nature and uses of objects by contact by handling them. Astereognosis, or more properly stereoagnosis, is the inability so to recognize objects. Employed in this sense the terms are general, are used to denote a symptom, like the word palsy, and connote nothing as to the method by which objects are recognized nor the reasons for failure to do so. As the inability may be either central or peripheral, may depend upon failure of one or more of the primary sensations, or may be caused by disturbance in combining the sensations to form percepts, and as these are two very different things, they should be clearly separated. The ability to recognize objects is not a sense. It is not classifiable with the touch sense, the temperature sense, or any of the other senses. It is a method of perception. It is the grouping together of many different sensations, and from the sum of them drawing a conclusion as to what the object is. Sensation tells us an object has a certain size, form, weight, consistency, etc. Perception combining these decides it is a certain object and nothing else. Sensation furnishes the material on which perception works. The inability to perceive may be due to a failure of one or more of the forms of sensation, a lack of sensory data, or, as was said in my previous paper,[1] "the patient may have lost the tactile mental images, as we must call them till increased knowledge gives us a better name, stored up from past tactile experiences, and, therefore, having nothing with which to compare the sensations received, when, for example, he holds a knife; having no memory of what the sensations were when he held a knife before, he cannot perceive it." Thirdly, "the trouble may be in the act or process of grouping together the many and various sensations

[1] Read at the meeting of the Philadelphia Neurological Society, December 17, 1900.
[2] A Case of Tactile Amnesia and Mind Blindness. Journal of Mental and Nervous Disease, May, 1897.

received from an object." These are three very different conditions, and though they all cause the same clinical result, it is doubtful if it is wise to group them all under one name.

As Hoffmann pointed out, and as others have verified, many sensory factors are concerned in the recognition of objects by contact. The tactile sense, including pressure, the localizing sense, the space sense—that is, the faculty of distinguishing simultaneous impressions—the muscular sense, including the recognition of weight, position, and active or passive movement, the temperature sense, and the pain sense are all of greater or less value. There has been quite a little discussion as to which is the most important. It would almost seem that none is always essential or rather which are essential for the recognition of any given object depends upon the nature of the object. Thus, a man with loss of the temperature sense would not be able to recognize a piece of ice, though all his other sensations were normal. For that occasion the temperature sense would be very important. A man without conception of weight could not distinguish a piece of pasteboard from a sheet of lead; he could only say he was holding an object of a certain size, shape, roughness, or smoothness, but he could not have a correct perception of its nature. One would expect that the tactile sense would be the most important, but in hysteria it may be entirely absent and stereoagnosis be preserved, and in organic disease there may be insensibility to light contact, contact in which, so far as possible, pressure is avoided, without any stereoagnostic difficulty. According to Joseph Sailer,[1] " in case of peripheral disturbance—that is, some disturbance in or between the centre in the parietal lobe and the terminations of the sensory nerves in the skin—stereoagnosis is lost if tactile sense is lost; it is usually, but not always, disturbed if the muscular sense is lost, but may persist if any of the other forms of cutaneous sensation are lost or disturbed." Dercum puts much stress upon the space sense, or, as he prefers to call it, the spacing sense. Finally, there may be complete inability to recognize objects by handling them without any disturbance of sensation. As an example of the occurrence of stereoagnosis as an isolated symptom, I will refer to a case[2] which I reported under the name of psychic anæsthesia.

The patient was a young man who, when a boy, had a received a fracture of the right parietal bone which had caused a temporary left-sided hemiplegia and hemianæsthesia. On recovering he found he could not recognize objects by the left hand. On examination years after the injury it was found that, though there was no palsy and no anæsthesia save the inability to localize sensations, he could not recognize any object in the left hand. Being at the time ignorant of the

[1] Journal of Mental and Nervous Disease, March, 1899.

[2] University Medical Magazine, October, 1897.

work of Hoffmann and Wernicke, and misled by the presence of some hysterical symptoms, I made the error of regarding the case as one of pure hysteria. The real explanation was that, being unable to localize sensations, he could not distinguish form.

The next case was one of tumor of the brain. The patient, a gentleman, aged thirty-seven years, was seen in consultation in November, 1898. His trouble had begun a few weeks before with a little weakness and stiffness of the left side of the face, and slight thickness of speech. Later the left arm and leg began to grow weak. He suffered somewhat from pain in the right parietal region. A few days before I saw him he had an attack of some kind, during which he was unconscious for a few moments.

Examination. He was a fairly well-built man. There was a slight left-sided hemiplegia, including the lower face. Station was good. Gait was a little hemiplegic. The right knee-jerk was small, the left active. All movements could be made with the left arm, but all were weak. There was slight impairment of tactile sensation on the thumb and index finger of the left hand and over a small area on the left side of the nose. He knew the position of the arm and fingers with the eyes closed. He localized light touch badly, but pressure, even when gentle, well. There was no disturbance of the other forms of sensation. Speech was a little inarticulate, but not aphasic. The pupillary reactions, vision, the extraocular movements, and the eye-grounds were normal. In the left hand there was complete stereoagnosis. He died away from the city several months later. His physician wrote me that a tumor was found in the white matter above the lateral ventricle. In this man the sensory pathways from the periphery to the sensory cortex must have been open, for his anæsthesia was too slight to be of any significance. If we assume, as seems permissible, that the perception of objects handled takes place in a different area of the brain than that in which the sensations are received, we can explain the case by the tumor having cut off the fibres joining the two areas.

The next case is interesting because it was partial, did not include all objects. The patient, a man, aged twenty-five years, was knocked down, and fractured the right parietal bone in June, 1899. Since the accident he has had twelve attacks like the following. The fingers of the left hand and the wrist flex, and a series of waves of pain pass down the arm to the finger-tips. An attack lasts about two minutes, and is never accompanied by unconsciousness. He was trephined a few months ago. Some spicules of bone were removed, but the membranes were not opened.

Examination. There was slight palsy of the left arm, and he used it awkwardly; indeed, it was quite ataxic. There was some disturbance of the sense of position of the arm with the eyes closed. The other senses were normal. There was partial stereoagnosis in the left hand. Some objects he recognized, others he did not. I could not discover that the difficulty was confined to any one class of objects—objects having any one quality in common. It was not a matter of speech difficulty, for that was entirely normal.

The next case belongs to an entirely different class than the preceding. The patient was an inmate of the Philadelphia Hospital in Dr. Dercum's and my service alternately, and died while under the care of the former, to whom I am indebted for the privilege of reporting

the history. The patient, G. W. C., aged fifty-two years, a printer, was admitted to the Philadelphia Hospital, November 8, 1899, complaining of weakness on the right side. His family and personal histories were unimportant. He stated that one month before coming to the hospital he suddenly became weak upon the right side without loss of consciousness. For the two preceding years he had been nervous, and had been much troubled by a coarse tremor of the head and limbs. The detailed notes of this, his first admission, have been lost, but this much is certain, he had a right-sided hemiplegia without aphasia, with slightly increased reflexes and a little rigidity, and without any stereoagnostic trouble. He improved rapidly, and was discharged at his own request, November 17, 1899. He was readmitted January 17, 1900, to Dr. Dercum's wards, and in a few days, on the change of service, came under my care.

Examination. He was a man of middle-age, spare, sallow, and with a vagabond's eczema. He walked fairly well but dragged the right leg a little. The grip in the right hand was almost *nil*, but he could make all movements with the right arm, though all were weak. There was slight but distinct lower right facial palsy. The tongue was protruded straight. There was during rest a tremor of both arms, which at first I thought was emotional. All movements of the right arm were accompanied by marked ataxiform jerking in it, and an increase of the tremor in the other hand. There was no inco-ordination of movements in the left arm. Station was fairly good, except that standing, like any other muscular effort, increased the tremor. He knew accurately the position of either arm with the eyes shut. Speech was at this time tremulous, but showed no aphasia of any type save that he frequently used the words right and left indiscriminately. He understood all that was said to him. The knee-jerks were somewhat large, but not spastic. There was no ankle clonus, and the plantar-jerk was normal. There were no contractures in the arm or leg. In both eyes, and especially in the left, there was neuroretinitis. The pupils were large. The irides responded promptly to light, to accommodation, and to convergence. Extraocular movements were good in all directions. Vision in the right eye was 4/xv; in the left 4/x. There was slight impairment of tactile sensibility on the right side—that is to say, a wisp of cotton gently touching the skin was not felt, but any pressure, even the slightest, was felt and properly localized. Brain tumor was diagnosed. By February 7th he had begun to have difficulty in distinguishing temperature on the right side. On the left side he recognized hot and cold and named them properly.

By March 14th there was marked lower right facial palsy. The right pupil was larger than the left. He could not stand alone, and the movements of the right arm were very weak, very tremulous, and very jerky. There was no muscular wasting. The biceps-jerk was increased on both sides. He could move the legs fairly well in bed, but they were too weak to sustain the weight of the body.

By March 18th he had improved in motor strength so much that he was able to walk and could use the right arm fairly well, but he was entirely unable to recognize any object held in the right hand. This was not a speech defect. The difficulty was not in recalling names or uttering them. He had no knowledge of the thing he held, or its nature or uses. He recognized and properly named all objects held in the left

hand. He understood all that was said to him. (Later this was not the case.) He recognized and named a watch on hearing it tick. By vision he recognized and named some objects ; others he recognized and described the uses of, but could not name ; and still others he neither recognized nor named. He recognized and named all letters printed in capitals except O, Y, T, C, S, V, and D, and read aloud the following words : dog, log, cow, table, bank, rain, dull, ring, gray, blue, rat, watch. Left and right, which were the first words he had misused in speaking, he also confused in reading. Many printed or written words he could neither recognize nor read aloud. Sentences he could not read, or, rather, some short and simple ones he could read word by word, but when he had reached the end could not recall the beginning. Many words that he could recognize in capitals he could not recognize in script or small letters. He could read many words containing one or even more letters which if shown to him singly he could not recognize at all. The stereoagnosis was persistent from the time of its onset until death, but his mind-blindness varied from day to day, though there was a constant downward tendency. At the beginning there was no word-deafness. Later it became necessary to repeat what was said once or twice, and in the last few weeks of life he was so dull mentally that no study of speech could be made. His capacity for spontaneous speech varied greatly. At first, on his ad-mission to the hospital, barring tremulousness, there was no trouble. Later he at times misused words so much that he could not be under-stood, and at other times he was able to carry on a conversation well. For a short time before death his speech was a mumbling jargon. The severity of the palsy varied greatly from time to time. Several times he became bed-ridden and was expected to die, but he rallied and became well enough to be out of bed. During the last few months the palsy and aphasia always increased after he had been out of bed a few hours. Throughout the course of his disease he com-plained of dull, diffuse headache. He never had any convulsions, and the hemiplegia never became spastic. He died August 27, 1900. The clinical diagnosis was brain tumor in or near the left angular gyrus. Necropsy verified the diagnosis. The tumor was found in the parietal lobe. It pressed against but did not invade the ascending parietal convolution, partially destroyed the angular gyrus, and involved almost the entire posterior parietal lobule. The white matter below was largely invaded. It probably arose in the white matter, and grew toward the cortex.

There are many interesting points in this case that cannot be dis-cussed now. The patient was under observation throughout almost the entire course of his illness. Starting out with an uncomplicated hemi-plegia, symptom was added to symptom as we watched him, and as the symptomatology became more complex its mechanism grew clearer and easier to understand. The course of events was slight hemiplegia, slight tactile anæsthesia, stereoagnosis, mind-blindness, loss of the tem-perature sense on one side, sensory aphasia varying in intensity, mental dulness, and death. I do not believe that the tactile anæsthesia stood in any causal relation to his inability to recognize objects. It was too

slight. Contact, much lighter than that which occurs on handling an object, was felt when his stereoagnosis was absolute. The other sensations, barring that of temperature, which was lost after the stereoagnosis had appeared, were felt normally.

The next case is very curious, because stereoagnosis was preserved when, according to all the rules, it ought to have been completely abolished. I reported it verbally to the section on internal medicine of the College of Physicians some time ago, and Dercum refers to it in his study of stereoagnosis.[1]

The patient, a woman, aged thirty years, was admitted to my wards at the Philadelphia Hospital, June 14, 1896. Two years before admission she awoke one morning and found herself paralyzed and without feeling on the left side. Speech was a little thick. In a week she was able to go about and continued to improve until December, 1895, when she became palsied in the left side of the face. The mouth was drawn to the right, and she could not close the left eye. Soon after the first palsy she suddenly became deaf in the left ear. Vision of the right eye was lost from injury.

Examination. She was very corpulent. All movements of the left arm were slow and weak. Her gait was slow, but not truly paretic, though the movements of the left leg seemed slower and weaker than those of the right. Station was good. Contractures were absent. There was no muscular wasting. The elbow-jerk could not be obtained. The knee-jerks were large, greatest on the right side, but not spastic. Ankle clonus was absent. She did not feel touch anywhere upon the left side, including the face. Deep pressure was felt everywhere, and the temperature sense was normal. There was some palsy of the entire left side of the face. The forehead was smooth, and she could not wrinkle the frontal muscle. The left eye could not be closed, and the mouth was drawn to the side. She was completely deaf in the left ear. Dr. de Schweinitz examined her eyes on June 16, 1896, and reported : " Right eye, pupil fixed. Entire atrophy of disc, which is greenish in color. On left side well-marked atrophy, which is also greenish. Arteries rather small. Veins not contracted. In neither eye is there any perivasculitis. Right eye blind. Left eye vision is 15/lxx. The field of the left eye is irregularly contracted, the lower and temporal field being nearly gone—hemianopia (?). Light response of left pupil normal. Right absent." Speech was normal and thought slow.

She was not re-examined till February 10, 1899. The motor symptoms, the reflexes, and the mental state were the same as before. The tactile, temperature, and spacing senses and the weight sense were all absent. The deepest pressure was not felt either as contact or pain. For eight or ten times she could put the right (normal) hand or arm, the eyes being blindfolded, in any position in which the left (anæsthetic) hand had been passively placed. After eight or ten times she would tire, and fail miserably. She could never put the left (anæsthetic) hand or arm in the position in which the right had been passively placed. This was not on account of palsy, because, as was said above, though the movements of the left arm were weak, all could be per-

formed. It is remarkable that though she knew the position of the left hand, as is shown by the fact that she could similarly place the right, yet she could not, knowing the position of the right hand, as she must have known, for she described it well, put the left in a similar position. She could not with the eyes closed bring the left hand directly to the right. Her only way of finding the right hand with the left was to carry the latter across the body to the shoulder and down the arm to the fingers. With the eyes open she was able to use the left hand to carry plates and trays about the ward. With such marked and total anæsthesia as she presented it was expected she would be stereoagnostic. She was not. She recognized and correctly named objects of all shapes and weights put in the anæsthetic hand. When Dr. Dercum examined her some months later her condition was the same, except that sometimes she made errors due to an inability to estimate relative weight. For example, she described accurately the shape of a piece of cardboard, but called it a piece of iron. At the present time (December 3, 1900) her condition has changed in so far that stereoagnosis is becoming quite marked. She now recognizes a few objects, but with most fails entirely. The plantar-jerk is normal on both sides. She has with the eyes shut no knowledge of the position of the left leg.
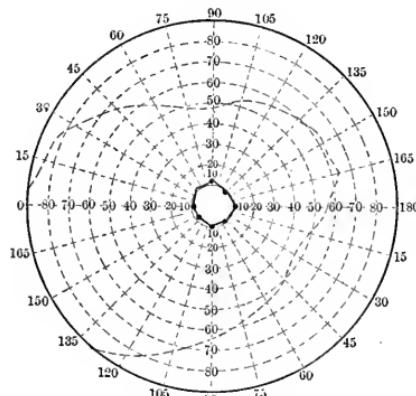
Field of vision for white; disc one centimetre in diameter, distance thirty-five centimetres.

Dr. Charles A. Oliver kindly examined the eyes several times, and reports as follows:

" Examination shows no evidence of grave external inflammatory alteration in either eye. Pupil of right eye the larger. The iris of the same eye insensible to individual exposure to light stimulus. Consensual reaction of pupil quite marked to light stimulus, accommodative effort, and convergence impulse. Iris of the left eye freely mobile to light, accommodation, and convergence. Extraocular movements greatly lessened, particularly those of the left eyeball. The greatest excursions obtained when the eyes are made to look downward. Upper lid of left eye slightly drooped. Optic nerve-head of right eye atrophic from previous inflammation. Optic nerve-head of left eye markedly degenerate from previous inflammation. Vision of right eye lost. Eye blind. Vision of left eye reduced to one-eighth of normal in visual field, which is greatly contracted. (See Figure.) *Conclusion.* It is most probable that these ocular findings are the results of two forms

of organic lesion—a left-sided peripheral and a central one.   Whether any of the symptoms are a part of the functional changes elsewhere seen in the patient it is impossible to assert from the ophthalmic signs alone."

The diagnosis in this case is difficult.   All the doctors who have seen her have said informally and in off-hand fashion that her sensory symptoms are hysterical.   I have, however, so often fallen into the diagnostic pitfall of calling a thing hysterical because it was strange, that I prefer to say I do not know.   The facial palsy is manifestly due to disease of the seventh nerve—is a peripheral palsy—a thing added on to her other troubles and independent of them.   If her history is accepted as correct, the hemiplegia did not come in the manner usual in hysteria.   It is not common for a hysteric patient to go to bed well and wake up paralyzed and with thick speech.   That there may be no contractures or great excess of reflex action in organic hemiplegias is well known.   The patient has no heart disease, and was below the usual age of cerebral hemorrhage at the time of onset.   She is probably a syphilitic, though no clear history could be obtained.   During the four years she has been in the hospital she has had no hysterical convulsions, nor, indeed, any hysterical symptoms unless the preservation of stereoagnosis with anæsthesia be such.   That stereoagnosis may be preserved in hysteria with loss of the touch and pressure sense is well known, but in all the cases I have seen the muscle sense has been preserved.   I know of no other case, organic or hysteric, presenting the same picture as this woman.

There is still another class of cases in some respects unlike any of those reported here.   In them there is, with preservation of sensibility for all forms of sensation, an inability to recognize objects in either hand.   The only two cases I have seen were accompanied by mind blindness.   The condition is probably always due to disease of the tactile perceptive area on both sides, or if the disease is limited to one side it is of such a nature as to influence the other by pressure.   One of my cases, the one referred to in my first paper as having been seen in the practice of Weir Mitchell, came to necropsy some time later while under the care of Dr. J. D. Eskridge, of Denver.   He wrote me that he found " diffuse sclerosis of the brain involving principally the occipital and parietal lobes."   Before death she had become totally blind in the ordinary sense, and demented.   The lesions were too wide-spread to be of any localizing value.

CONCLUSIONS.   1. The ability to recognize objects by handling them depends upon the integrity of the afferent nerves, the cortical sensory area, and the cortical perceptive area.

2. Disease of either of these will make it impossible for the patient to recognize objects by handling them.

3. We may dismiss from consideration here the inability to recognize objects because of disease of the sensory nerves or of the sensory tracts in the spinal cord, medulla, and pons. Such inability is due to anæsthesia of one or more types.

4. There is a distinct area of the cortex in which sensations produced by handling objects are grouped together to form tactile memory images. This, the tactile perceptive area, is in the parietal lobe. It is not the same thing as the sensory area, though it may be located within the boundaries of the latter.

5. It would probably be well to limit the term stereoagnosis to cases in which the inability to recognize objects by contact is due to some failure of sensation caused by brain disease either in the cortical sensory area itself or in the fibres going to it.

6. Tactile amnesia includes the cases in which, on account of disease in the tactile perceptive area, the tactile memory images are destroyed. It is not infrequently associated with mind-blindness, and, indeed, it is probable that always in recognizing objects by handling them we recall from memory a more or less faint recollection of the visual appearance of the object. Auditory memories are less frequently recalled, because less frequently needed to make a complete percept, and those of smell and taste quite rarely.

7. Which form of sensation is most necessary for the recognition of any given object depends upon the qualities of the object. Tactile anæsthesia, if sensibility to stronger pressure is preserved, causes little or no difficulty. The space sense, the localizing sense, and the sense of position are probably the most important, for by them we learn the form of objects—the most important element in recognition.

8. When in the cerebral palsies of children there is inability to recognize objects in the paralyzed hand, it is often caused, as Oppenheim states, by the fact that tactile memory images were never acquired.

9. Granting that the tactile perceptive area is not the same as the cortical sensory area, such cases as the second reported here can be explained on the hypothesis of a lesion cutting off the fibres joining the two areas.

CLINICAL STUDY OF ACUTE MYOCARDITIS.

By BEVERLEY ROBINSON, M.D.,
of NEW YORK.

ONE of the most interesting and also difficult subjects connected with cardiac pathology is that of inflammation of the muscular walls. Formerly, as we know, the existence of this affection was denied, or, if admitted by some authors, had relatively small importance as compared

with inflammation of the endocardium or pericardium. At a later date in the history of cardiac disorders myocarditis commenced to assume some importance. It is only, however, within a brief period that the different affections of the muscular structure of the heart have received their true value and consideration. I am glad to state at present that the medical mind has had an awakening, and to those who are careful observers and clinicians the mere presence of a murmur or a pericardial friction-sound is no longer of great moment unless it carries with it the probability that sooner or later real functional disability will occur owing to its effects upon the adjacent muscular walls. Of course, the effects of muscular changes must depend largely upon many conditions. The causation is different; the circumstances in which they occur are manifold, and may be acute or chronic, limited or diffuse.

In acute diseases, especially those affecting the whole organism, and mainly those of febrile type, we have to do with the most interesting and most important cases, because our time is limited to act properly and efficiently, and the threatening is often imminent, although the indications may be obscure and our useful interference be questionable. Mere doing is by no means so imperative as well doing. Life often hangs in the balance, and immediately so.

In the eruptive fevers—in diphtheria, typhoid fever, pneumonia, rheumatism, in many septic conditions, in toxic states, and, above all, acute alcoholism at times—how often do we stand at the bedside and ask, Is this a case where the muscular fibre of the heart is already touched by the poison of the disease to the degree where acute degeneration is already present? Unquestionably there are times when the closest observation and attention on our part will still leave us in great and anxious doubt. Other instances present themselves in which we feel that we are reasonably sure in our judgment and are quite confident that no other diagnosis is sufficient or permissible to explain symptoms and signs satisfactorily unless it be inflamed or degenerated cardiac muscle.

In many instances of typhoid fever and diphtheria of marked virulence and intensity in which the general symptoms have been alarming almost from the inception of the disease, in a very brief period, or about the fourth, fifth, or sixth days, we occasionally remark a feeble and very rapid heart action. The first sound may be low, distant, muffled; the second sound may be somewhat accentuated and particularly over the pulmonary area, or, again, this sound, although still distinct, lacks force and normal intensity. With such a heart we have a rapid, feeble pulse, small in volume, and easily depressible; it may be unequal, somewhat irregular; a beat may now and then be lost or inappreciable to our tactile sensations. Instead of a rapid heart we may have a slow one; but this is rare, almost exceptional in these acute cases. A soft,

blowing murmur at the apex and systolic in time is often developed. It may be limited as to its area or it may be widely heard over the præcordia. While this is true, it is still heard most intensely near the apex-beat or in the pulmonary area. In the latter case a pulsation of the second and third left intercostal spaces may accompany it ; and this pulsation is of itself, as Russell has noted, an evidence of some degree of heart failure. Restlessness, profuse perspiration, especially of the face and upper limbs, accompany this condition. The patient is apathetic, listless, soporose, or frequently there is a low, muttering delirium from which he can be separated for a moment only by acquiring his attention with forcible and loud questioning. With such a cardiac state we may or may not have more or less implication of the bronchial tubes or lung structure ; and dulness at the bases with fine crepitation during inspiration and over an area of at least a hand's breadth is no uncommon finding. The urine is apt to be somewhat deficient as to quantity and to contain abundant urates, an occasional cast, hyaline or granular, and a notable amount of albumin.

Cases like the foregoing, in diphtheria especially, are apt to terminate fatally and often suddenly. This is also true of croupous pneumonia. In typhoid fever they may go along about in the same way for several days and then perhaps measurably improve. Such cases even in typhoid fever are prone to be long and severe ones, and it is frequently difficult to say positively what the ultimate outcome will be, even though no other dangerous complication may subsequently arise.

What is the pathology of such a condition ? In the few rare instances where I believe I have seen it at the autopsy, very little at times that is positively indicative of muscular changes. It is true the heart is soft and flabby ; it tears more easily than it should ; it is darker in color, probably from blood staining ; heart clots are few, badly formed, and usually cruoric in typhoid fever.

In pneumonia and diphtheria, on the contrary, they are often in large part fibrinous, sometimes gelatinous looking, sometimes with the fluid well pressed out of them, and almost appear to have several layers of superimposed fibrin. Extensions of the clot are not uncommon in the pulmonary artery, and they often fill moderately the right ventricular cavity and auricle. The heart may be somewhat enlarged, but where this is the case I have attributed it to previous disease. In a similar way where there has been any very manifest valvular trouble I could not believe that the acute trouble had anything to do with it.

I shall make an exception for a certain degree of vascularization of the mitral valve which I have seen more than once. In diphtheria notably there is often a decided beading, with redness, swelling, and increased vascularity of its free margin. The other valves are usually normal, at least to the naked eye. Under the microscope the cardiac

fibres present little or nothing abnormal ; here and there, perhaps, there may be a slight granular condition, and the striæ may not be so distinct as normal.

In those instances in which I have seen autopsies later on in the course of acute disease of febrile type—and I am now speaking particularly of typhoid fever, pneumonia, and diphtheria—I have occasionally seen areas of the heart muscle either in the papillary muscles or in the walls of the ventricles which seemed paler to the naked eye than the rest of the heart. In these areas without doubt there was a deposit of fat—microscopical sections have later revealed decided fatty degeneration at least in limited areas ; and when that is the case not only the nuclei of the muscle may be much changed in form and structure, but the heart fibres otherwise show the degeneration. The striation of some fibres may have almost completely disappeared, the granulations may be very numerous, interspersed with many fat globules, and the interstitial cellular tissue between the primitive muscular bundles may be notably increased, besides containing many red or white blood-cells.

I confess there is no direction in which this inflammatory and perhaps degenerative development interests me more than in croupous pneumonia. The reason is not far to seek. In no other acute disease does life terminate more frequently, suddenly, and at times unexpectedly from so-called " heart failure " than it does here. Now what is this due to unless it be through the myocardial inflammation or degeneration which has become developed under the poison of the disease ? And this is proved particularly when we encounter those instances of very limited or partial lung involvement, and yet they march steadily from bad to worse despite our every effort made to save them.

Up to the present time we have no drug or system of medication that is in any way satisfactory to meet these cases. The nearest approach to it, in my judgment, is to respond to the indications in the following manner : on the one hand, to help restore lowered nerve tone and strengthen muscular activity with frequently repeated and even large doses of strychnine ; and, on the other, to destroy or neutralize the pernicious effects of bacterial invasion of lung tissue, and thence the blood and whole organism, with inhalations mainly antiseptic in character, of which I still believe beechwood creosote is the best, though very imperfect, of which we have knowledge. I have not been able to appreciate that the use of heart tonics like digitalis and strophanthus, in anything except small, repeated doses, and then only in a very temporary manner, has proved to be really useful. Nor, indeed, with the recognized pathology of the bad cases of pneumonia, diphtheria, or typhoid fever do I see how they could be.

It always seems to me as though the great risk of producing such forcible contraction of the relatively healthy fibres as to effect cardiac

dilatation through distention of those which are more or less degenerated neutralized all useful action. This is no mere baseless theory. It is a conviction forced upon me by close, attentive clinical observation and inquiry.

I believe that the poisonous effects of these diseases, certainly so far as the heart is concerned, in many instances, are more or less self-limited. This being admitted, our effort should be to avoid, above all, doing more or less irretrievable harm, and that, too, in a very rapid manner. In many of these cases I am confident we do much less harm when we guard our use of digitalis and strophanthus with nitroglycerin or the nitrites. Thus we break up peripheral resistance as much as may be, and so we lessen the necessity of the heart doing more work than it can possibly perform. The diffusible stimulants are the medicines which are most clearly indicated and many times urgently required. Alcohol, ammonia, ether, chloroform, camphor—all these are good and at least rarely give us cause for regret.

There is one drug which I feel at present is far less used in these acute cases than it should be, and that is iodide of potassium. Its effect in stimulating the nerve centres, especially when the febrile stage has lasted more than a few days, is perhaps known to a few, but is not yet sufficiently insisted upon. Later, of course, and wherever other means have failed us, and particularly wherever we dread the formation of interstitial growth between cardiac fibres, already many good observers acknowledge its value and rely upon its use more than any other drug.

With respect to oxygen, opinions are various. Some there are who, despite frequent use of oxygen, affirm that it has little or no value. Others there are who believe, and I am now more and more firmly fixed in this opinion, that provided we give oxygen in its pure form, modified only by a small proportion of nitrous monoxide, freely and more or less continuously during the stress of the acute disease, we shall be able frequently to ward off or prevent the calamitous effects of the bacterial poison in effecting cardiac degeneration and notably that which is fatty.

In addition to the foregoing I feel called upon to refer to the use of cold in pneumonia only to speak of it in measured terms of praise. While I have little doubt that in some instances a moderately cold compress, properly applied around the chest, may be serviceable in relieving pain, oppression, and lowering temperature, I do not believe that we usually obtain the stimulating effects upon the cutaneous circulation and toning up of the central nervous system which has been ardently claimed for it. I am rather of the opinion that similar good effects may be obtained from moderate warmth.

No doubt the old-fashioned poultice of meal or flaxseed was dirty, cumbersome, and unnecessarily troublesome to the patient and nurse ; no doubt, also, by its frequent change it fatigued the patient often very

much, and yet it did soothe and relieve. We shall obtain these good effects from lukewarm water covered with impermeable material, which retains heat and moisture and without being a source of anything like the same degree of annoyance.

I know these are heterodox views to many ; I know that the stimulating effects of cold on the cutaneous circulation and central nervous system are most ably advocated by a few, and in this connection I should be derelict not to mention the name of Dr. Simon Baruch, who has done so much to explain and to fortify those who hold to the great advantages of cold externally and internally employed.

I must confess it always seems to me when a patient's nervous system is already suffering intensely from profound systemic poisoning and when degenerative processes are, without doubt, in a sure way of being developed, that what we need especially is to soothe rather than to stimulate, unless with our stimulation we afford the food that is most readily disposed of as fuel ; and such, I take it, is essentially the rôle of alcohol and the ethers in severe acute febrile disease.

Why is it when all other means fail do we almost invariably have recourse to the soothing and stimulating effects of morphine hypodermatically, or, better still, sometimes small doses of extract of opium internally ? Here, again, I believe our useful interference must of necessity be a very measured one. Pass by the narrow limit, and we do irretrievable harm ; but no one can deny when a heart is weakened to its utmost, when urinary secretion is very small and concentrated, that many, many times such patients are marvellously relieved in every way by the use of these drugs. I have repeatedly seen the heart beats lessened in frequency and gain in strength and regularity. I have also seen the urinary secretion become more abundant and resume all its normal characters.

The question of the application of cold, of course, is often a relative one ; but what I claim is that the application of a compress soaked and wrung from water at 90° to 95° F. does just as much and more good than the compress applied from water at 65° or 70° F. Very soon the compress will reach the former or even a higher temperature when the body is at 103° to 104° F. or still higher, and surely the discomfort and risks resulting from brief, temporary shocks to the nervous system which frequently repeated cold compresses mean are not to be lightly considered.

As to the cold bath in pneumonia, even the most enthusiastic of the advocates of its use has abandoned it whenever an adult pneumonia is treated (see *Medical Record*, August 4, 1900, article by Simon Baruch), and finally reserves it solely for certain cases of pneumonia in children. I am fully prepared to admit in this question of the utility of cold applications in pneumonia that here as everywhere in the practice of

medicine allowance must always be made for personal idiosyncrasy and epidemic influence. There are a few patients who do bear cold applications apparently well, without much harm resulting, and occasionally with seeming good effects.

There are also seasons in which pneumonias—despite seeming virulence, it may be, at the start or in the initial stage—do not later show at all the same virulence as we have seen at other times and under seemingly like conditions. Why this is will not be satisfactorily understood until susceptibility to disease and the intimate laws which govern it are far better understood than they are by us to-day.

It must be always borne in mind in the care of these cases how essential it is to prevent as far as possible all exertion on the part of the patient. The nurse should see to it that whenever a change of position is desirable she should aid him as far as she can ; even the raising of the head in the voluntary act of drinking should be assisted. An alarming or fatal attack of syncope may possibly occur unless attention be thus rigidly exercised. Frequently repeated and easily assimilable nutrition should be kept up with beef peptonoids, milk, koumyss, broths, egg-nog, etc.

In more than one instance I have felt assured that I have helped my patient's condition markedly by giving an ounce or more of black coffee by the mouth several times in twenty-four hours, or a stimulating enema of coffee per rectum in much larger quantity if there was evident great prostration, sudden collapse, or pronounced stomachal intolerance.

Later on in the course of acute febrile diseases sudden death from heart failure due to myocarditis is not very infrequent. I have known it to occur in diphtheria when the outlook had appeared relatively favorable and when the convalescent stage was almost reached. I have also had at least one sad experience of it with a child recovering apparently from typhoid fever. In many instances I have had little or no doubt that owing to acute degeneration of cardiac muscular fibres death occurred which might otherwise have been averted.

In these cases there have been areas of the papillary muscles or of the left or right ventricular walls where the yellow coloration, soft, friable tissue and perhaps greasy feel gave to the naked eye positive indications of what the microscope would surely reveal, viz., more or less complete disappearance and fatty degeneration of muscular fibres.

It is reported by several reliable observers that they have found also hyperplasia of connective tissue between the fibres, with numerous leucocytes, red cells, and proliferative cells. Pigment granules, regularly or irregularly disseminated within and between muscular fibres, have been frequently observed. This change, especially as regards quantity, is more apt to occur the older the patient is. The cells, both of muscle fibre and cellular tissue, are much changed in form and structure or

may have disappeared altogether. It is also true that horizontal stria-tion of muscle and the long fibrillation often no longer exist in parts. The muscular fibre may be almost hyaline in appearance and relatively broad. It may be also atrophied and diminished in size owing to the pressure and contraction exerted by connective tissue increase. The latter change, however, is one much more frequently met with in chronic myocarditis, where almost all changes, according to some writers, partake of this character and make a real fibroid degeneration of the cardiac muscle.

We should not expect to find fatty changes always widely dissem-inated or deeply seated. Frequently these changes are merely in patches, and elsewhere the cardiac fibre is apparently and relatively healthy so far as the microscope reports. Even in the midst of a local degeneration of tissue certain fibres are much more affected than others, and alongside of one fibre which is almost wholly granular or fatty another will be found nearly intact.

In those cases where there is accompanying endocarditis or pericar-ditis the degeneration is apt to be much more diffuse than where no in-flammatory condition of these membranes exists. The papillary muscles and the ventricles, especially the left near the apex, are the parts usually most degenerated. The auricles are very rarely at all notably involved.

In many of these cases, although the symptoms and signs during life pointed with great certainty toward probable degeneration of muscular cardiac fibre, we are surprised at the autopsy to find little or no evidence of it. Beside, the valves and orifices are usually intact ; at least there is no evidence of acute inflammation or old sclerotic changes. The heart, however, is soft, flabby, has lost its shape, flattens out when rest-ing on the table ; the walls are sometimes somewhat thinner than normal and the cavities slightly increased in size. In such cases when the right or left ventricle is opened at the apex and the hydrostatic test made the valve is not competent.

Two facts are thus explained to my mind which have been recognized during life : first, functional disability ; second, a soft, blowing murmur heard at the apex during systole. All we can positively say of such hearts is that they are really weakened by disease—that they have lost their contractile power. Such hearts may have been primarily weak organs, and just as they might not have been able to react properly to any undue or excessive strain during health without showing the bad effects of it, so during an attack of acute febrile disease they give way rapidly both in function and structure.

Of course, to the pure anatomist or pathologist, who regards only organic lesion as shown by eye and microscopical lens, to speak of func-tional adynamia as something all important smacks too closely of mere vague theory without proper and sufficient basis for intelligent argu-

ment; but to others, and among these I find myself, there is just as much cogency in the reasoning which admits a latent force or energy—a vitality, in other words, which exists to a greater or less degree in certain tissues of individuals and which is very defective in others—as to attribute all symptoms and signs to appreciable local changes.

In any event, and for the while, we must count with such reasoning and such facts; and it is not the evidence of highest wisdom, to my mind, to ignore them. We are prone to explain these facts occasionally when our every effort at accurate research, both as regards the tissues and fluids of the economy, remains negative, by speaking of being run down, under par, of poor nutrition, and using such catch terms as though these words or expressions advanced our knowledge very materially or were satisfactory in any final discussion.

In the *malade imaginaire of Molière* there is a conference of the learned doctors as to how and why opium causes sleep. The final conclusion reached was *"opium a le pouvoir dormitif,"* and that is all there is to it.

All saving agents, so to speak, whether regarded as food or medicines, seem to me rationally what we should most keenly look for when called upon to treat these cases. This is why agents such as tea, coffee, cocoa, kola, etc., are so valuable when the body is submitted to a great strain and where little or no other food or drink can be had. Take the soldiers of our army, the sailors of our navy, in time of war, on forced marches or imprisoned in fortresses; take men on the plains, or explorers in the Arctic regions, or mountaineers who make high and laborious ascensions—in any and all of these situations the universal report is that in time of greatest need nothing will or can replace them. Not only do they seemingly give almost as much if not more, at times, of temporary energy and strength than alcohols or ethers, but their power is far more enduring and beneficial when exposure or hardship has to be for a long time resisted.

Physiologically they lessen the rapidity and degree of combustion in the economy, the tissues are thus saved from any destructive action of phagocytic cells, and living force and energy are thus spared to their utmost.

I have attempted in giving black coffee frequently to my cases of acute febrile disease, with evidences of heart weakness or cardiac degeneration, to meet the most evident indications up to the present time. I have supplemented or varied the use of coffee at times both with cocoa and kola. The former of these, particularly in the form of extract, given by mouth or hypodermatically, has often helped me when I had almost given up hope. I am inclined to believe that if my faith and trust were greater, and I were to use these agents sooner and more freely, I would get far better results in cases of acute myocardial degenera-

tion.   One reason I believe that these agents do not always respond to our hopes is because the preparation employed is relatively inert.   Many cocoa leaves, as many digitalis leaves, are dry and inert and of poor quality when first gathered.   I cannot place too much insistence upon this.   I have experimented with many preparations of cocoa as sold by different druggists, and many are relatively inactive and worthless. Too much care and inquiry cannot be taken in order to obtain a thoroughly reliable drug.   And it is only too true that the power the best of us have over the march, duration, and ultimate outcome of acute disease is limited, and that this small power is reduced to a minimum when we employ drugs which have little or no physiological action when employed in the doses and forms which are wide-spread.

Hence, in part, the great skepticism so visible everywhere among our best clinicians and practitioners of widest experience when they speak of the curative action of drugs.   There are, I freely admit, few truly valuable ones among the vast mass of those that are advertised and sold, and for this reason, also, it behooves us jealously to guard and protect those that are from the meddling of ignorant, fraudulent persons.

In many cases of acute myocarditis the question arises as to whether we have to do with concomitant endocarditis or pericarditis.   In some cases, indeed, it is undetermined for a time at least as to whether the symptoms and signs present are not entirely due to the inflammation of the endocardium or pericardium and the myocardium is little or not at all involved in inflammatory or degenerative changes.

Endocarditis is not easily diagnosed at times ; it may be very obscure.   The local symptoms are often almost or entirely absent, with the exception of the systolic murmur present over a limited or somewhat wide area of the præcordia.   There may be no localized pain or marked discomfort ; no increased pulse or force in cardiac beats ; no irregularity or intermittency of cardiac contractions ; no abnormal pulsation in intercostal spaces ; no vascular distention in vessels of the neck.   The local expression of endocardial inflammation in slight degree simply reduces itself to the murmur.   It is true this murmur may be rougher, more intense, more metallic than the one proceeding from mere dilatation of orifice without local change or from lack of close coaptation of the velæ due to lack of power in the heart muscle ; but, as we know, the nature and intensity of a bruit is not of itself absolutely characteristic of inflammatory or other changes.   Again, and this is more frequently true, the murmur itself is absolutely similar to one that we may fairly attribute to myocarditis alone.   The pulse, of course, in endocarditis may rapidly gain appreciably in force and frequency, but this is usually true only when the inflammation of the endocardium is considerable.   There may be a sudden or rapid rise of temperature ; but here, again, this means marked inflammatory changes of the endocar-

dium, and if accompanied by rigors or repeated chilly sensations there will arise a reasonable suspicion as to whether there is not some septic process present, such, indeed, as would lead to the ulcerative form of endocarditis. If this be true usually the murmur has shown itself rapidly and with much intensity, and its loudness very soon increases, beside being accompanied with general phenomena quite different from those of myocarditis, with tendency to cardiac weakness or failure.

I admit that much of the differential diagnosis is based upon probabilities rather than upon certainties; but this statement is no truer and need be no more emphatic than in numerous other difficult positions in the practice of medicine. Of course, the presence of a special form of disease must always be considered. Other conditions being the same, I should look for endocarditis as being far more probable in acute rheumatism than the other diseases already mentioned, simply because we know that acute rheumatism has a particular predilection to attack the endocardium. Even in rheumatic fever, however, I am now convinced that we have rather exaggerated this tendency at times, and that many instances of what is commonly affirmed to be endocarditis have been without doubt mainly a myocardial inflammation or degeneration.

While I have not always been able to make the differential diagnosis in the initial stage of the manifest cardiac determination, the march of the disease and the nature and perhaps rapid or sure, though slower, disappearance of the cardiac abnormal bruit have thoroughly convinced me of the physical cause producing it.

If there be a pericardial inflammation the superficial character and the nature of the friction-sounds may be sufficient to differentiate these cases. Moreover, very soon the increased and special form of cardiac dulness, the particular displacement of the apex-beat, the distant and more muffled and duller apex-beats, with very possibly the almost entire absence of these beats to inspection, and it may be palpation, help the accuracy of our differential diagnosis very much.

I have not had occasion to see hearts at the autopsy table in cases of influenza except where this disease had been complicated with pneumonia, and then the hearts resemble somewhat those already described. One marked difference, however, is in the contents of the cavities. Instead of the right ventricle and auricle and large vessels containing fibrinous coagula, these were much softer, contained far less fibrin, and were darker and far more cruoric, viz., contained a far larger number of red blood-globules. I am quite confident, however, that the heart of very many influenza patients is much affected. I have no doubt that the nervous structures, ganglia, vagi, and sympathetic have lost their tone and gone through certain changes. They may be recognizable under the microscope on account of the cardiac and other symptoms present during life.

Beside the nervous involvement there is also abundant evidence in influenza that the muscle is attacked, and it is highly probable that the great depression, continued weakness, syncopal attacks, slow recovery, frequent returns of some of these symptoms subsequently and somewhat periodically at times, are all due in part to myocardial changes. In no disease with which I have a clincal experience is it more important to guard patients against overexertion than influenza during its acute and subsequent stages.

Patients who have been attacked severely with this disease may show after a few weeks or months some cardiac enlargement due to dilatation and evidently occasioned directly by the influenza attack. Not only, therefore, during the period of the acute stage of this disease should we be specially careful in not permitting any physical exertion—not even the mere sitting posture in bed without assistance and support—but we should for many weeks subsequent to an attack at all severe urge upon patient and friends the absolute necessity of great prudence and the strict avoidance of all intemperate or continuous bodily or mental effort. Many hours of the twenty-four had better be passed in repose or sleep and complete quiet mentally, and the recumbent posture should be sought whenever the heart shows any signs of exhaustion. Going upstairs, walking too rapidly, lifting heavy burdens, indulgence at the table, use of tea, coffee, or tobacco, should all be strictly limited for many weeks or months. Of course, there is the personal equation here, as everywhere in medicine, and there are many patients who recuperate rapidly even from an attack of influenza, and who on that account need not, perhaps, exercise quite the same severe precautionary measures as others. It is also true that the poison may be far less virulent in certain instances than in others, and, therefore, we should not expect the same severe effects to proceed from it. Nevertheless, it is ever a safe rule to bear in mind how essential it is for the patient's ultimate well-being to be careful in the convalescent period of influenza, typhoid fever, rheumatism, diphtheria, the eruptive fevers, and pneumonia.

I have seen many times in the convalescent stage of these diseases the pulse remain unduly frequent for long periods of time, and I have likewise seen this tachycardia show itself after very slight exertion, when the patient otherwise seemed well and could scarcely be made to appreciate the importance of considering this symptom, which pointed clearly to weakness of the muscular walls of the heart.

Bradycardia may also be present, and the marked slowness of the pulse, going down frequently to fifty pulsations or less, may be the most important if not almost the sole evidence of impairment of cardiac power. Surely too much emphasis cannot be placed on the judicious valuation of this condition. If it be properly considered and wisely

treated not only will convalescence be in the end much shortened, but
all danger of subsequent probability of cardiac dilatation will be avoided
as far as may be.

It is manifest that in cases of moderate endocarditis or pericarditis,
during their acute stage especially, it is incumbent upon us to insist
upon absolute rest in bed in the recumbent posture (and even though
the type of the disease in which it occurs may be very mild in char-
acter) for many days or even weeks ; and yet, after all, I do not believe
the danger from overexertion in these affections is half so great when
they are unaccompanied with myocardial changes, nor do I believe
that *per se* they are so threatening to the future well-being of the
patient.

I do not deny that the facts to which I have referred are more or
less well known to the average good clinician and wise practitioner ;
still, I know in my own case it has taken many long years of practical
observation and experience, and the care of numerous patients, to thor-
oughly convince me of its very great interest and importance. Here is
where, unfortunately, the modern text-book of practice falls far short of
actual needs. Sayings similar in import to mine may be alluded to in
a line or two, but that is about all, and unless a man's own thought and
daily experience and observation serve to bring the facts constantly
before him he is prone to ignore or forget them. Even modern text-
books on cardiac disorders are apt to be far too brief, in my judgment,
in treating of the importance of rest in the treatment of acute disease.

Most people will swallow drugs, cover themselves with lotions and
liniments, be blistered or burnt, even go through a minor surgical oper-
ation, with far more equanimity and resignation than they will submit
to being put to bed and remain there for days or weeks unless they are
in great pain or are suffering from some marked disablement that they
can thoroughly appreciate. The practitioner has a difficult rôle many
times, especially during the convalescent period, in managing these
patients to their own advantage.

It is not always wisdom to explain to people about their ailments.
They try to understand the doctor's position, and yet they do not.
They either exaggerate the gravity of their own case or ignore it far
too much. Whenever it is a question particularly of the heart, infinitely
more harm is sometimes done by showing accurately by explanation in
what the danger consists than in part to avoid explanation, or not to
speak at all, except to avoid making any categorical statement. This is,
of course, deplorable for many reasons. Truth is mighty and should
prevail, and an intelligent man or woman should claim the right to know
precisely what the matter is and what the physician really thinks of
their case. Just as soon, however, as the bald statement is made that
the heart structure is at all affected, then they proceed by vain im-

aginings to make themselves miserable for a long, long while to come.
It becomes almost impossible at times to disabuse their minds and make
life tolerable to them.   They fret and worry, become introspective and
hypochondriacal, and lose snap and energy, which render their lives a
burden to themselves as well as to others.   They are often the victims
of false dreads and foolish fears ; they imagine they cannot recover
and must always be, to a certain extent, invalids ; they harp on their
hearts, and they run from one physician to another to obtain expert
judgment.   It would seem as though the minds of such could be dis-
abused, and that the earnest, convinced statement of their physician
that they would get all right in time if they are only careful and sen-
sible would be sufficient to quiet their fears and restore healthy mental
fibre ; but, alas ! in many cases this unhappily is not true.

I do not wish to be understood as upholding at all that this should
make the practitioner either untruthful or misleading, but I do mean
to say that it should make him very, very careful and circumspect as
to what he says.   He must wholly gauge the disease he has to treat ;
he must, also, always consider the personality he has to do with ; and
singular it is that the very persons whom we might suppose are those
least likely to be demoralized by the truth if spoken fully and without
prevarication are, perhaps of all others, the ones to become most readily
discouraged and ultimately the most miserable unless with much
time, tact, and care they are absolutely convinced of the error in their
thoughts.

With respect to the other treatment of endocarditis or pericarditis, if
they be present, I would add that while I believe counter-irritation in
the form of iodine or blisters very useful frequently in shortening their
duration and intensity, I am not convinced that they would have much
value in the treatment of independent myocarditis of the sort I have
endeavored to study.

As to warm applications over the præcordia, and, better still, hot
fomentations frequently repeated, and particularly where there is evident
cardiac weakness, these I believe are of really great value.   They cer-
tainly stimulate cardiac contractions to a very notable degree, and even
though there be considerable increase already in bodily temperature, I
recognize no strong objection to their use.

To my mind, the question of the amount of fever is often of secondary
importance, and in nearly all cases is but one of numerous symptoms
pointing to the intensity or gravity of the systemic poisoning. To com-
bat it rationally and without manifest detriment to other expressions of
disease may be all right, indeed probably is correct according to our
actual knowledge.   To do more than this is many times obviously
uncalled for, and tends very much to produce harmful interference.

If the coudition be already an adynamic one, where the bodily forces

are at a very low ebb and other forms of immediate and powerful stimulation are required, I fail to see why transmitted heat, properly applied, may not awaken and indeed partially restore wasted nerve force very much more certainly than cold. To cite particular instances in which this is true, even though not wholly analogous, would not be difficult.

In any great shock to the nervous system following a blow or fall ; in the complete nervous depression from loss of blood ; in the nervous exhaustion caused by fright or imminent peril ; in the utter goneness accompanying bodily privations due to lack of food or sleep, heat locally applied over the heart, either as hot-water bag, hot compresses, mustard poultices (where it is combined with the counter-irritant), would be our first thought and usually prove most helpful ; and as the body heat of an infective disease is in many particulars nothing very different from the other appreciable expressions of lowered nerve tone, why not make use of it promptly and efficiently ?

As to the general treatment of endocarditis and pericarditis, I would naturally incline to the use of the salicylates in moderate doses if acute rheumatism were present ; but I should be more than doubtful of their utility even in these instances where there were complications of the other febrile conditions studied in this article. Certainly, I would not give them where the nutrition was already at a low ebb or the stomach had shown signs of intolerance.

During the convalescent period of acute myocarditis complicating acute febrile diseases the indications for massage, resistant movements, and saline carbonic baths, according to the Schott system employed originally at Nauheim, seem pretty clearly defined.

It is to be borne in mind, however, that just as dyspnœa is often a very marked symptom of myocarditis in its most acute stage, so later it will frequently guide and direct us as to the efficacy of the movements and baths and the duration of them. On its appearance in any notable degree they should be stopped and only resumed with great care and moderation. Harm results more frequently from doing too much at too early a period than through a judicious reserve as to both of these considerations.

It is true that the Nauheim treatment employed at the springs, or artificially used elsewhere, may prove to be very beneficial in well-selected cases, even though the heart fibres be degenerated. It is, also, unquestionable that where the degeneration is far advanced and the general nutrition has become much undermined by previous disease or advancing years, it may work more than passing harm and become of very little real value, but rather detrimental than the reverse.

Acute myocarditis may and does occur frequently among children as a complication of their acute febrile diseases, and especially is

this to be remembered in scarlatina, whooping-cough, diphtheria, and measles.

I am confident that this acute degeneration of heart muscle will many times explain sudden failure of cardiac power when apparently the patient is progressing favorably. I am also convinced that it will explain the delayed convalescence of numerous cases in which this complication would easily be disregarded or overlooked unless particular attention be directed to it. No doubt many instances of subsequent cardiac dilatation, with or without accompanying hypertrophy, have been occasioned solely by inattention to or ignorance of this muscular degeneration.

The very activity of children, their desire to play and romp and tire themselves with their games and contests, is an additional reason why special care should be exercised so as to ward off an unfortunate sequela which may be otherwise lasting and troublesome. I have not infrequently met with cases which, as I interpret them at present, may trace their later cardiac inadequacy to the influence of diseases of early childhood.

I do not believe, in my experience, that the acute myocarditis of children differs very materially, so far as symptoms go, from the same disease in adults. The ultimate prognosis, however, it seems to me, is less serious, simply because the nutrition of the child being usually more active his cell elements are re-established sooner and more surely, and hence the untoward, far-reaching effects of cardiac weakness are less likely to become manifest.

REVIEWS.

The International Text-book of Surgery by American and British
Authors. Edited by J. Collins Warren, M.D., LL.D., Professor of
Surgery in Harvard Medical College; Surgeon to the Massachusetts
General Hospital, and A. Pearce Gould, M.S., F.R.C.S., Surgeon to
Middlesex Hospital; Lecturer on Practical Surgery and Teacher of
Operative Surgery, Middlesex Hospital Medical School; Member of the
Court of Examiners of the Royal School of Surgeons, England. Vol. I.
General and Operative Surgery. With 458 illustrations in the text, and
nine full-page plates in colors. Philadelphia: W. B. Saunders, 1900.

This praiseworthy work has been prepared under the editorship of an
American and an English surgeon, each of international repute, with the
collaboration of thirty-three American and fourteen English authors.
When we come to examine the authorship of the sixty-three chapters
that compose the two volumes we find that some forty-six, or more than
two-thirds, are from the pen of American surgeons, so that while the
work is, strictly speaking, of international authorship the number of
chapters by American exceed those of English authors.

In their preface to the first volume the editors announce that their
aim has been to produce a reliable text-book of surgery, embodying a
clear but succinct statement of our present knowledge of surgical path-
ology, symptomatology, and diagnosis, and such a detailed account of
treatment as to form a reliable guide to modern practice, and that,
while not aiming at the merely novel, they have carefully omitted an-
tiquated methods, and hope that the reader will find in these pages
only what is practically useful to-day. Reviewed from such a stand-
point, it may be said that the editors have been eminently successful
and have produced a book which in every way fulfils the obligations as
announced in the introduction.

It is a difficult matter to review, in the space ordinarily allotted,
with any very great thoroughness a work covering such an enormous field
and exploiting the views of some threescore authors. Many of the
chapters are, in point of fact, monographs of the subject treated, as-
signed to, in many instances, individuals who have had so much experi-
ence in that particular branch that their writings are not a mere
compilation, as so many of the works turned out to-day, but embody
the views and opinions of one who can speak authoritatively. Every-
one recognizes, however, the necessity of resorting to this plan in the
preparation of a modern text-book, as it is practically impossible for
one man to write authoritatively on the vast range of subjects embraced
in the field of surgery. One has but to refer to the authorship of
the various chapters to be assured of the intrinsic worth of this text-
book. Thus, in Vol. I., Cabot contributes an article on the Blood;
Warren, on Inflammation, Erysipelas and Gangrene, as well as on a

number of other subjects; Pilcher, on Fractures; Watson Cheyne, on Diseases of the Bone; Bland-Sutton, on Tumors; Bradford, on Congenital Dislocation of the Hip, Flat-foot and Club-foot. In Vol. II., McBurney has been assigned the subject of the Vermiform Appendix; Fenger, the Kidneys; to Bull, the subject of Hernia; to Mayo Robson, the Diagnosis of Abdominal Diseases, and, again, to the senior editor, the Surgery of the Breast, the Technique of Abdominal Surgery, Acute Intestinal Obstruction; and to T. Orne Green, the Surgery of the Ear.

The arrangement of the subject-matter conforms in general to that of modern text-books. Vol. I. is devoted to general surgery, including the effects of traumatism and inflammation, anæsthesia, operative technique, minor and operative surgery, injuries and diseases of the various systems, including the bones, the joints, the lymphatics and bloodvessels, the nerves, muscles, tendons, and bursæ. Vol. II. is devoted to the various branches of special or regional surgery, and contains some of unusual character, such as a chapter on the Influence of Age and Race on Surgical Affections; chapters on Military and Naval Surgery, by medical officers of the respective services; one on the Traumatic Neuroses, and another on Tropical Surgery, by Cantlee, a lecturer at the London School of Tropical Medicine.

The question might arise as to the necessity of a modern surgical book containing articles which treat of subjects belonging, strictly speaking, to the specialties, such as the eye, the ear, gonorrhœa, and syphilis. The presence of chapters on these subjects no doubt enhances its value as a work of reference for the general practitioner, although it is not likely that the aural or the ophthalmic surgeon or the genitourinary specialist will purchase a treatise on general surgery solely to have at hand the one chapter in which he is more particularly interested. The same might be said of surgical bacteriology, a subject which has of recent years made such rapid strides that it is a difficult matter to cover even the elements of the subject in a single chapter. As a matter of education, however, it is a good object lesson for the medical student to see the first chapter of a surgical text-book given up to surgical bacteriology; he is taught thereby to appreciate the immense value to the surgeon of the information which has emanated from the laboratory of bacteriology.

Repetitions are noticeable here and there, but these are unavoidable in books so arranged. Thus, for example, tuberculous lymphangitis is treated under three headings—under that of surgical tuberculosis, under the surgery of lymphatics, and for the third time in the chapter on the Surgery of the Neck. The chapter on Surgical Tuberculosis might well have been omitted, as it belongs more properly to works on general pathology. So much of the pathology of tuberculosis with which the student should be familiar may be discussed in connection with the tissue systems, the lymphatics, the genito-urinary organs, the bones and joints, and so on; in fact, the most common manifestation of surgical tuberculosis, joint and bone tuberculosis, is not discussed in this chapter at all.

Again, in the chapter on Diseases of the Joints, the author by way of introduction airs his views on the pathology of inflammation, which has already been very properly treated in one of the early chapters. Osteitis deformans is treated under a separate heading in the chapter

on the Diseases of the Bones, and, again, with rheumatoid arthritis in Diseases of the Joints. These commentaries are passed not in the sense of reflections, but as indications of how in a future edition the authors might practice some economy as to the number of pages without affecting the usefulness or popularity of their text-book.

The chapter on Special Joints should either be omitted or the subject-matter inculcated with that on Diseases of the Joints. As it stands now it reflects no credit upon the book as a whole. However familiar the author may be with his subject, he has not expressed his ideas in a way that calls for any great amount of commendation. Thus he writes, " that in neglected or obstinate cases the *flexed and slung* limb *has to be tied up* against the trunk for months, but may often be *got well* with perseverance." Again, " in the progress to recovery the arm *at first continues* disabled;" again, " arthritis of the shoulder in cases of *tubercle* or *osteomyelitis* is frequently attended with abscess, *which may burst and leave sinuses.*" Inflammation of the hip-joint may attend other (*i. e.*, other than tubercular) *infective states or general disorders of the system,* etc. One is told that " *puffy œdema* may easily occur in sprain of the shoulder."

The teachings propounded throughout are, on the whole, sound, and there are no noteworthy contradictory statements, such as are apt to appear in books of composite authorship. We think it a much better plan to teach the student to disassociate those conditions which result on the one hand from traumatism, and, on the other, from microbic invasion, reserving for the latter the term inflammation ; " that the changes produced by inflammation are those expressive of destruction rather than repair ;" and that the alterations in the structures met with after traumatism are but the reaction upon the part of the tissues necessary to effect reparation. The other view is taken, however, and inflammation classified as simple (of traumatic origin) and infective (of microbic origin).

The chapter devoted to Constitutional Effects of Wound Infection is exceptionally well written ; the subject is treated in the light of the most recent addition to our knowledge of these fevers. One hesitates, however, to indorse a more complicated classification of a subject already so confusing to the student. The introduction into this class of so-called surgical fevers of a form of fever styled septic intoxication, which is described as a disease due to the resorption of poisons from foci of suppuration, seems perfectly reasonable, but the same cannot be said of septicopyæmia, " which is used to convey the impression that the symptoms of sepsis are present as well as those of pyæmia." It is difficult enough already to draw any sharp lines clinically between pyæmia and septicæmia ; why, therefore, make matters still more complicated by attempting to recognize a third variety ?

In the chapter on Gangrene one notes the novel way in which the various forms of gangrene are classified, the classification being based on the size and nature of the vessels involved. Thus : 1. Gangrene due to impairment of the general circulation. 2. Obstruction of main arteries and veins. 3. Obstruction of the smaller arteries. 4. Obstruction of the arterioles. 5. Obstruction of the capillaries and venules.

There are a number of chapters which are deserving of the highest commendation, and therefore should not pass unnoticed. Those are the chapters on Wounds and their Repair ; on the Constitutional Reactions

to Wounds and their Infections; on the Technique of Aseptic Surgery —a chapter which in point of thoroughness should stand at the head of the list—on Anæsthetics, which includes an excellent consideration of nitrous oxide gas; and on Fractures and Dislocations.

In Vol. II., the chapters on Hernia, on the Breast, on the Stomach and Intestines, on the Vermiform Appendix, on the Traumatic Neuroses, and on Military, Naval, and Tropical Surgery are all of a high order of excellence. The authors have provoked some adverse criticism by the manner in which they have subdivided the subjects. Thus, genito-urinary diseases are treated in four chapters, by as many authors, one being devoted to the ureters, one to the kidneys, one to the urethra, bladder, and prostate, and a fourth to the scrotum and testes. The surgery of the œsophagus has been isolated from the chapter on Surgery of the Neck, as has the surgery of the uterus from the chapter on Gynecology. Just as in Vol. I., the subject of the joints was subdivided as follows: injuries of the joints, dislocation of the hips, diseases of the joints, diseases of the special joints, congenital dislocation of the hip, flat-foot, club-foot. If the book is to be used as one of reference, pure and simple, this arrangement of the subject-matter will not detract from its value; if as a text-book, however, it would have been better had the matter been entrusted to fewer authors.

On the whole, however, it may be said that this international text-book of surgery is modern in every particular, most comprehensive in its scope, sound and practical in its teachings, and is wholly deserving of the popularity already won.   C. H. F.

TRAITÉ DE CHIRURGIE D'URGENCE. Par FÉLIX LEJARS, Professor Agrégé à la Faculté de Médecine de Paris. 482 figures dont 193 dessinées d'apres nature, par le DR. E. DALEINE, et 103 photographies originales. 8 vo., pp. 751. Paris: Masson et Cie, 1899.

A TREATISE ON EMERGENCY SURGERY. By FELIX LEJARS.

THE title of this volume strikes one at first as not altogether satisfactory, but the criticism is perhaps sentimental rather than real. A book with a somewhat similar title, namely, *Imperative Surgery*, has recently been published in America to which the same objection has suggested itself. These titles are suggestive of an effort to be sensational, a trait always objectionable in scientific writing.

An inspection of Professor Lejars' book, however, shows that it is written in the truest scientific spirit, and by a surgeon evidently well grounded in the principles of modern surgery and of the keenest surgical perception. He truly says that the number of emergency operations has been extended as operative results have become more positive through modern scientific surgical methods. As surgeons are better armed, he who accepts the designation of physician or surgeon accepts by that act a greater degree of responsibility than was formerly the case.

He explains that his book is written to show what ought to be done in emergencies, when a physician, who does not take up surgery as a specialty, meets with cases requiring surgical treatment and cannot

obtain the aid of a consultant, or when a surgeon is far from the
resources which surround him in a hospital. Very true is his statement
that even if a physician never expects to operate he should at least be
familiar with the present resources and operative successes of surgical
art. Operations of emergency surgery should therefore be familiar to
physicians as well as to professed specialists in surgery.

The author properly lays stress upon the fact that instruments and
dressings for emergency operations should always be ready for transpor-
tation by the surgeon in order to save precious time when urgent opera-
tions are to be done. Some form of bag or satchel filled with the usual
instruments and dressings is demanded for such use. Complicated
methods of sterilization are not discussed, but an effort is made to show
how things may be done in a simple and efficient manner when the sur-
roundings of a well-stocked hospital operating-room are not accessible.

The author believes in the use of ether rather than chloroform as an
anæsthetic, and is evidently aggressive and up to date in the treatment
of fractures, injuries to the skull and brain, and perforating wounds
and other lesions of the abdominal and pelvic organs.

An interesting feature is the introduction of emergency operations in
conditions of the eye and ear. His injunction that iridectomy should be
done at once for acute glaucoma is an indication of the thoroughness
with which these questions not usually discussed in surgical text-books
are handled. In the same way, his insistence upon complete reduction
of fractures of the lower end of the radius shows a familiarity with the
practical side of the treatment of this often neglected injury.

The articles on wounds of great vessels, foreign bodies in the air pas-
sages, urgent conditions of the heart and lungs, ruptures of the urethra,
and hernia will be read with the greatest benefit by the surgical specialist,
as well as by the general practitioner who, as a rule, does not expect to
assume the responsibility of surgical operations.

Dislocations, injuries of nerves, and imperforate anus are discussed
because they often need prompt operative relief.

An inspection of this volume makes it clear that it is a valuable book
of reference which will do very much to add to the reputation of the
author and to which the surgical teacher can with benefit refer. The
very numerous illustrations are unusually beautiful and demonstrative.

<div style="text-align:right">J. B. R.</div>

MANUAL OF SURGERY. By CHARLES STONHAM, F.R.C.S. ENG., Senior
    Surgeon to the Westminster Hospital, etc. In three volumes. New
    York : The Macmillan Co.

THE present is an age of labor-saving devices, and among such
devices are manuals. Many manuals have recently come from the
press. The term manual is decidedly elastic. It is supposed to mean
a rather diminutive book or at least one of a convenient size which
contains the elements of a science. Undoubtedly the usual conception
of a manual is a small book, but at the present day the size of such
publications varies according to the " taste and fancy " of the writers,
to use Mr. Samuel Weller's expression. For instance, the splendid
two-volume book upon *Operative Surgery*, written by Mr. Frederick

Treves, and modestly called a manual, is thorough, is complete, and consists of about 1500 large pages. Some teachers are bitterly opposed to manuals, claiming that such books are read to the exclusion of larger and more comprehensive treatises, the effect being to make the student lazy and superficial. There is much force in this criticism, and if a manual itself is superficial and produced lazily we think the condemnation proper. If, however, a manual is of the right sort, is not superficial, and is not the product of dulness, we do not agree with the criticism. It is true that the use of a manual to the exclusion of larger works is an evil, but it is better to read a small book carefully than to read a large one carelessly or not at all. Good students will use a manual properly—that is, in association with and in subordination to a larger text-book. Bad students will not study an encyclopædic text-book under any circumstances, and will study a manual or will study nothing. It might be said that there should be no such indifferent students. Such a statement would be true, but poor students exist because of an evil system, and they will continue to exist until the system is amended. Conditions must be met as they exist, and we should do our best to educate even indifferent students into safe if not into brilliant men.

A well-written manual not only concentrates and condenses, but winnows the chaff from the grain, elucidates obscure views and difficult propositions, and is a great help to even the best of students. By its aid a student can refresh his memory; can read up subjects not touched upon by a lecturer; can find out what he needs to study in a larger book, and can store his mind with truths and essentials. A good manual is a very different thing from those pernicious productions which are used to " cram " for examinations. A good manual is sure to be used often, and the term which really fits it is the word in its older and better sense—that is, a book constantly in the hand. The word was thus used in referring to the office-book of the Catholic priests of mediæval England. Stonham's book belongs to the class of good manuals. It consists of about 1400 pages, and is divided into three volumes, each one being of convenient size.

Vol. I. treats of General Surgery; Vol. II. of Injuries; Vol. III. of Regional Surgery. The book contains a section on injuries of the eye and their effects, by Mr. Donald Gunn.

We regard this manual as a very useful book. It is tersely and clearly written, and most of the statements are definite and sufficiently positive. It is not a mere compilation, but represents the views of a surgeon of large experience, who knows whereof he speaks; one who, to drop into the vernacular, " has often been there." Unfortunately many of the pictures are crude and poor, and some of them are atrocities. For instance, Fig. 29, Vol. III., is a cut which would justify any self-respecting rickety skeleton in bringing suit for libel.

We have not the space to do more than hint at Mr. Stonham's views. We are glad to see that he does not think inflammation is always due to bacteria and always destructive. The contrary opinion is enunciated so peremptorily by our laboratory lords and masters that we often loose sight of clinical facts. Adami has called us back to common-sense by pointing out that inflammation is reaction to injury and an effort to effect repair.

Stonham regards fibrin ferment as the cause of septic fever, although Schnitzler and Ewald seem to prove that nucleins and albumoses are

the real causes. The author advocates high amputation in senile gangrene ; does not consider diabetics such hopeless subjects for operation as is generally thought ; believes that emphysematous gangrene is due to the bacillus of malignant œdema, and does not mention the bacillus aërogenes capsulatus ; does not differentiate clearly when to use heat in inflammation ; shares with most observers doubt as to the value of tetanus antitoxin, and points out that though amputation is discredited in tetanus, as the bacillus is confined to the wound, amputation ought to remove it ; disbelieves in the abortive treatment of gonorrhœa ; treats only exceptional cases of syphilis by hypodermatic or intravenous injections of mercury ; maintains that Ducrey's bacillus is the cause of chancroid, admitting, however, that pyogenic organisms may also be present ; operates early in hare-lip, that is, between the fourth and sixth week of life, if possible, and always before the seventh month ; operates upon a cleft of the soft palate when the child is about one year old, and operates upon a cleft of the bony palate when the child is between its fourth and sixth years. An operation between the fourth and sixth years is far earlier than was formerly advised, but Mr. Owen —and, we think, wisely--operates earlier still. Owen operates during the second year, because if operation is deferred longer speech will be permanently impaired.

Stonham, in speaking of shock, says that in very rare cases the patient should be bled. He advocates bleeding when the heart's action is extremely feeble and the jugulars are full and distended. Personally, we have never seen a case in which we considered bleeding advisable or even safe.

The author maintains that delirium tremens and traumatic delirium are clinically identical ; that in many cases of fracture of the patella Barker's method is the best treatment ; that tracheotomy is to be preferred to intubation ; that in the operation of nephropexy the sutures should be composed of kangaroo-tendon, and should pass through the kidney-substance, and that Kraske's operation should not, as a rule, be preceded by colostomy. We regret that in the article upon dislocations of the hip-joint he does not even notice the brilliant and original studies of Allis.

Stonham advocates radical extirpation of the tongue for cancer, but does not remove the glands beneath the jaw unless they are enlarged. Glandular infection takes place usually by emboli, and the glands are diseased for some time before they are obviously enlarged. We think that a thorough operation should include removal of the glands whether they are palpable or not. In speaking of cancer of the lip, he does not speak of removal of the glands, and yet in these cases the obligation to remove the related gland is as imperative as it is in cancer of the tongue or cancer of the breast. Stonham's operation for the radical cure of hernia impresses us as quite inadequate, and he reserves Bassini's operation for bad cases or '' when recurrence after operation has occurred.'' Unfortunately, he fails to describe in detail the modern '' thorough '' operation for cancer of the breast. Stonham's views on appendicitis may justly be described as antiquated. In subacute cases he employs rest in the dorsal position, applies hot fomentations to the iliac region, and sometimes leeches to relieve pain. He gives opium in sufficient amount to relieve pain, and opens the bowels by enemata, or, if necessary, by small doses of sulphate of magnesia. In very acute cases he

opens the abdomen and removes the appendix. In an abscess he evacuates the pus by an incision, but '' makes no attempt to find the perforated appendix,'' though '' if it presents in the wound '' he removes it.

We disagree radically with some of Mr. Stonham's statements, but nevertheless recognize the arguments upon his side of the case and cordially recommend the book. J. C. DA C.

MINOR SURGERY AND BANDAGING. BY HENRY R. WHARTON, M.D., Demonstrator of Surgery in the University of Pennsylvania, etc. With 502 illustrations and 594 pages. Fourth edition. Philadelphia and New York: Lea Brothers & Co.

BUT little need be said as to the merits of this work, for, if we may judge from the reception accorded to the previous editions, we feel assured that the fourth edition of this work will receive a most cordial welcome.

The text has been thoroughly revised, which, with the new material added, brings the work up to the standard of the most modern surgical teachings.

A new chapter on Surgical Bacteriology gives a concise description of the various kinds of micro-organisms; the methods of their cultivation, inoculation, and staining; also a clear and sufficiently thorough description of the varieties of surgical importance.

No portion of the work should appeal to the student more than the section devoted to the operative procedures that may be practised upon the cadaver, most of the operations being accompanied by very good cuts.

In this, as in the previous editions, the author's concise manner of dealing with the essentials of a subject has not been sacrificed, and we can truthfully say that the fourth edition has but further enhanced the value of this work to the medical student. T. C. H.

ATLAS AND EPITOME OF GYNECOLOGY. By DR. OSKAR SCHAEFFER, Privatdocent of Obstetrics and Gynecology in the University of Heidelberg. Authorized translation from the second revised and enlarged German edition. Edited by RICHARD C. NORRIS, A.M., M.D., Surgeon-in-charge, Preston Retreat, Philadelphia; Gynecologist to the Methodist Episcopal Hospital and to the Philadelphia Hospital, etc. Pp. 272. With 207 colored illustrations on 90 plates and 62 illustrations in the text. Philadelphia: W. B. Saunders & Co., 1900.

THOSE who are familiar with the first German edition of this work will note many improvements and additions which render it almost a new book. Of the illustrations it is difficult to speak in too high terms of approval. They are so clear and true to nature that the accompanying

explanations are almost superfluous. We would call attention especially to the chapters on Displacements, Laceration of the Cervix, and Neoplasms of the Uterus. That on displacements condenses a vast amount of useful information within the limits of a few pages.

Ovarian cysts are fully described and illustrated. The important subject of pelvic inflammation is clearly set forth. Although the text is exceedingly condensed, as would be expected in an epitome, the whole field of gynecology is well covered, even the subject of operative technique receiving considerable attention.

Non-surgical treatment is carefully considered, with especial reference to the newer remedies. Atmocausis is described on page 115. A useful therapeutic table is appended. In general we may add that the book is typical of the great advances made in the teaching of gynecology during the past few years, when clinical facts have taken the place of theories. We commend it most earnestly to students and practitioners.

H. C. C.

L'ANNEE CHIRURGICALE, REVUE ENCYCLOPEDIQUE DE CHIRURGIE GENERALE ET SPECIALE. Publiée par le DOCTEUR A. DEPAGE, Agrégé a l'Université libre de Bruxelles, Chirurgien des Hôpitaux de Bruxelles. Première année, quarto, pp. 1970. Bruxelles: Henri Lamertin, 1899.

THE SURGICAL YEAR. AN ENCYCLOPÆDIC REVIEW OF GENERAL AND SPECIAL SURGERY.

THIS work is a comprehensive review of the literature of general and special surgery published during the year 1898. The editor, Dr. Depage, has as associates in the labor of compilation over fifty professional colleagues. His desire is to continue the publication annually and thus to give to the medical world the benefit of the new ideas emanating from students of surgical science in all countries. An indirect result of this record of surgical progress will be to give early diffusion to novelties in treatment and thus benefit mankind in general. It will also serve to obviate unnecessary experimental work in directions already investigated and to settle claims of priority in discovery or invention.

It is stated that 8000 original works have been translated and analyzed in the preparation of this volume, and the editor offers, in order to have authors' views properly presented, to print short abstracts prepared by the authors themselves. The scientific portion of the encyclopædia is prefaced by a short necrology, giving a list of surgical workers deceased during the year.

In its general characteristics L'Année Chirurgicale resembles Sajous' Annual of Universal Medical Sciences, which was, during its existence, such an aid to those desirous of keeping informed of medical progress. It, however, deals with surgery only, and to a certain extent will fill the place formerly held by Sajous' Annual and the Index Medicus.

The book is divided into sections, each dealing with a particular department of surgery; but as these are not arranged alphabetically, and there is no index, it will be difficult for the reader to find that which he seeks.

J. B. R.

PROGRESS

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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A Peculiar Form of Chronic Icterus.—BETTMANN (*Münchener medicin-ische Wochenschrift*, 1900, No. 23) reports the following : A merchant, aged twenty-nine years, was jaundiced since childhood. The icterus varied in intensity at times, but never disappeared completely. Exacerbations were often preceded by chills and tugging pains in the body and extremities. After a few hours the jaundice was worse and remained so for half to a whole day. The urine was then darker, sometimes blackish. After such attacks the patient felt weak. The attacks decreased in frequency and in intensity. There was no pain in the right side, but at times pain and an increasing pressure in the left side. Otherwise there were no symptoms, except that the stools were irregular (diarrhœa alternating with constipa-tion), never pale, but often dark. There was no history of malaria or syph-ilis. For several years the patient had severe attacks of nose-bleed. The family history was negative. Physical examination showed distinct, but not intense, jaundice, the liver was barely palpable, the gall-bladder region negative. The spleen was greatly enlarged, measuring 16 by 27 cm., harder than normal, tender on pressure. The urine showed a urate sediment, but contained no bile-pigment, urobilin, or hæmoglobin. The blood showed red blood-corpuscles, 4,216,000 ; leucocytes, 8800 ; hæmoglobin, 75 per cent.

The author was at first inclined to look on the case as one of Hayem's " ictère chronique infectieux splenomegalique," but further investigation of the history opened up another explanation. The patient said that the exacerbations were usually due to excessive eating or drinking, to psychic excitement, excessive muscular exercise, such as marching and dancing, and especially to cold. He was extraordinarily influenced by cold, and in winter the jaundice was always worse. This led to the supposition of hæmoglobinuria, and, as a matter of fact, the patient had had the urine examined after an attack, with the result that blood-corpuscles and hæmo-

globin were found. The effect of marching and of immersing the hands in ice-water was tried, and with positive results. After immersing the hands for ten minutes the patient began to yawn and shiver and then sweat. He complained of nausea and vertigo; vomited; had pain in the arms. In a few hours the jaundice was more intense. The urine contained albumin and red blood-corpuscles, but no bile-pigment or hæmoglobin. The blood showed no distinct change from the former examinations, so far as the count was concerned, but there were numerous shadows, and staining revealed marked polychromatophilia. The blood-serum showed dissolved hæmoglobin. The patient was seen frequently, and repeated examinations of the urine were made. Bile-pigment was never found, though there were traces of urobilin. The other conditions were unchanged. The author concludes that the patient had a hæmoglobinæmia, usually with abortive paroxysms, the blood coloring matter being altered before it could be excreted in the urine. This might be due to a congenital abnormality of the blood. From the difficulty of investigating such a case during the paroxysms the author raises the question whether in Hayem's cases hæmoglobinæmia may have been over-looked—a thing that is all the more possible because the symptoms of the attack are such as could readily be ascribed to liver disease, especially biliary colic. The treatment of the case was purely symptomatic and tonic, with avoidance of those things that were likely to bring on an attack. Most of the subjective disturbance was due to the enlarged spleen, but with the probability that this was spodogenic, having the object of working over the excess of broken-down blood-corpuscles, extirpation could not be recommended.

Prognosis in Glycosuria and Diabetes.—HIRSCHFELD (*Berliner klinische Wochenschrift*, 1900, No. 26) concludes a thoughtful article on this subject as follows: All authors agree that the prognosis in the milder forms of diabetes is more favorable than has hitherto been considered by the profession.

Relative recovery—*i. e.*, absence of glycosuria with the ingestion of 200 grains of carbohydrates daily—is to be expected when in the beginning of the disease 80 to 85 per cent. of carbohydrates are consumed in the body.

Lessened assimilation of carbohydrates may be observed after influenza, after peculiar colicky attacks (pancreatic colic), and to an especially severe degree in cases with furuncle and gangrene.

Increased severity of glycosuria is sometimes indicated by increased quantity of urine, improvement by diminished excretion.

At times increase of glycosuria coincides with rapid increase of weight, and subsides when the diet is restricted.

The cardiac weakness so common in diabetes is most favorably influenced by mild antidiabetic diet, not wholly excluding carbohydrates.

The Cause of the Presystolic Murmur.—GIBSON (*The Edinburgh Medical Journal*, September, 1900, p. 212) draws attention to the extensive discussion that has taken place in regard to the explanation of the murmurs of mitral obstruction, ever since the discovery of the purring thrill by Corvisart and of the presystolic murmur by Fauvel. He points out that the murmur of mitral stenosis occurs at the apex, and may occur immediately after the

second sound—usually termed diastolic ; or occurring a little later—therefore
sometimes called post-diastolic, or taking place immediately in advance of
the first sound—the well-known presystolic murmur. While the existence
and character of these murmurs is well recognized, there is considerable
difference of opinion as to the explanation of their occurrence.

The usual explanation given for these murmurs is that those of diastolic
and postdiastolic rhythm are produced by the active diastole of the left
ventricle drawing blood from the auricle, but also aided by the general on-
ward current of the blood, impelled through the pulmonary artery and
pulmonary veins by the right ventricle, which in such cases is always hyper-
trophied. The presystolic murmur has been and is generally considered as
due to the contraction of the left auricle, and its absence, or disappearance
and reappearance, attributed to varying degrees of weakness of this part of
the heart. Gairdner advanced this explanation for the presystolic murmur,
and his view was later confirmed and amplified by Tagge and Balfour, and
has been adopted by the profession generally. Its acceptance, however, has
not been universal.

The first person to express doubt as to the correctness and sufficiency of
Gairdner's explanation was Ormerod in 1864. He raised the question
whether the presystolic murmur was due to obstruction to the flow of blood
from the auricle to the ventricle during the auricular contraction, or to
imperfection of the auriculo-ventricular valve, allowing regurgitation dur-
ing contraction of the ventricle. He expressed doubt whether the contrac-
tion of the auricle, slight and momentary as experimentalists then believed
it to be, could produce so loud a sound. He saw no objection to the second
view, " which assumes that coaptation of all the portions of the valves is
not simultaneous ; but that when at a certain point of contraction the valve
is closed the regurgitant stream is cut off and the cessation of the murmur
coincides with the sudden jerk of valvular tension." Barclay, Charlwood
Turner, and Dickinson with slight modifications supported the ventricular
causation of the presystolic murmur advanced by Ormerod. Brockbank has
given his support to the " heretical theory," as he calls it. His view is that
" the crescendo murmur of mitral stenosis is produced by blood regurgi-
tating through the stiff, rigid orifice of the narrowed valve, while the orifice
which resists closure is being rapidly diminished in area and finally oblit-
erated by the action of a strong force, which on its part increases rapidly in
strength with the duration of the bruit."

Brockbank holds that any theory which explains the production of a cres-
cendo murmur must hold good no matter what the condition of the left
auricle may be, and he states that the murmur not uncommonly occurs in
cases in which the auricle is dilated and weak.

Cowan and Gibbes, in recent articles, with slight variations cast their
opinion on the side of the " orthodox theory " of Gairdner. The former
holds that the murmur of mitral stenosis is caused in its earlier portion by
the blood driven through the thickened valves, by the auricular systole, and
in its terminal part by blood flowing into the ventricle while changes in the
tension of the valves and alterations in the lumen of the orifice are taking
place, the result of the contraction of the ventricle as a whole and of the
musculi papillares in particular.

Gibson then proceeds to weigh the arguments advanced in favor of the two theories. He supports Gairdner's theory of the causation of the presystolic murmur. He says that the one simple fact that the presystolic murmur may begin as a diastolic murmur with the second sound, and be continued, without appreciable alteration in its character, up to the first sound, to his mind entirely negatives the regurgitant theory of the presystolic portion, which would require an absolute revolution in our knowledge of the cardiac mechanism.

[With this view I believe a majority of teachers on this side of the water agree.—W. O.]

The Pituitary Gland as a Factor in Acromegaly and Giantism.— WOODS HUTCHINSON has written a series of very interesting articles on the above subject. The early papers were published in 1898, and the more recent ones have just appeared.

Hutchinson points out in his first paper that previous to 1890 the pituitary gland was almost unanimously regarded as a purely vestigial structure and possessing no present value to the organism. In that year interest in its function, if it possessed any, was aroused by the announcement of Souza-Leite, that the gland was markedly enlarged in most cases of the disease known as acromegaly, which was first described by Marie in 1886.

As a result of the analysis of the literature on the subject, and in particular of nineteen cases of acromegaly in which microscopic study of the enlarged pituitary gland was made, Hutchinson draws the following conclusions :

1. That the pituitary body is still functional.

2. That disturbances of its metabolism are the principal factors in both acromegaly and giantism, the difference between the results being simply due to the stage of individual development at which the disturbance of its function begins.

3. That the nature of the overgrowth in both these diseases is primarily on the order of a pure functional hypertrophy ; later, however, losing some of the definiteness of its impulse, and either producing immature tissue of a mixed type or resulting in simple hemorrhagic exudation, with either cyst formation or complete breaking down of the tissue mass.

4. That it seems probable, although upon this head the evidence is still uncertain, that some part is played by this body in " dwarfism," rickets, and the dwarf forms of cretinism.

5. That a reflex disturbance of its function may possibly underlie the distrophy accompanying pharyngeal adenoids.

6. That it would appear to be a sort of "growth centre" or proportion regulator of the entire appendicular skeleton.—*New York Medical Journal*, vol. lxvii., 1898, pp. 341, 450, and vol. lxxii., 1900, July 21 and 28.

Tracheal Tugging in Mediastinal Tumor.—AUERBACH (*Deutsche medicinische Wochenschrift*, 1900, No. 8) reports two cases illustrating the necessity of using Oliver's sign in the diagnosis of suspected aortic aneurism. In one case there was a primary cancer of the stomach with metastases in the abdomen and the supraclavicular and bronchial glands. Over the upper part of

the thorax there was a diffuse, weak systolic shock, but no circumscribed pulsation. The manubrium and body of the sternum showed an area of dulness continuous with the slightly displaced heart dulness. Oliver's symptom of systolic downward tugging of the larynx was distinctly present while the breath was held. On pressing the larynx toward the left a distinct pulsation from left to right could be observed, but on pressing the cartilage to the right the lateral pulsation described by Cardarelli could not be seen. Although Oliver's symptom was very distinct, there were no other points in the history or physical condition to confirm it. It was, therefore, ascribed to a mediastinal tumor, as A. Frankel suggested might occur. The autopsy confirmed this. The mediastinum was filled with a mass of cancer nodules adherent to the vertebra and surrounding the aorta. The trachea was also surrounded, and the new growth extended into the peribronchial tissue, especially around the left bronchus, where it formed a mass three to four centimetres thick between the arch of the aorta and that bronchus, and closely adherent to both. The peculiar relation thus brought about between the aorta and the left bronchus had the same effect as an aneurism on the under surface of the aorta, with the exception that in the present case the systolic dilatation of the aorta was communicated to the bronchus, and in that way caused the tugging of the trachea and larynx.

In the second case a man, aged forty-eight years, formerly the subject of rheumatism and nephritis and dyspnœic for some time, was suddenly attacked with cough and hæmoptysis. Similar attacks occurred again at intervals, with loss of weight. There was dulness over the left side of the chest, with distention in that part. The heart was slightly enlarged, with marked epigastric pulsation and systolic shock in the heart region. Oliver's sign was distinct. The sputum was watery and contained blood and mucus. Many examinations for tumor cells were negative. The diagnosis lay between mediastinal tumor and aneurism of the arch of the aorta, leaning to the latter on account of the uncertain differential diagnostic features and the positive tracheal tugging. Autopsy, however, showed that there was a bronchial carcinoma of the left lung, with metastases to the bronchial lymphglands, extensive indurative pneumonia of the left upper lobe, and chronic endocarditis of the aortic and mitral valves. Between the bronchus and the aorta were several moderately enlarged lymph-glands, forming a mass the size of a walnut, attached both to the under surface of the arch and the bronchus. Although such conditions occur but rarely, they lessen the diagnostic value of Oliver's sign and make it all the more necessary to examine all the other signs carefully as well as to lay due importance on the history.

Symptoms of Brain Pressure in Typhoid Fever.—SALOMON (*Berliner klinische Wochenschrift*, 1900, No. 6) has been struck by observing in a number of cases of typhoid fever that the optic nerves gave an ophthalmoscopic picture resembling that seen in cases of intracranial pressure. There was not a distinct papillitis, but the papilla looked more or less veiled, its capillaries were injected, its edges indistinct—though often only on the temporal side—its veins somewhat dilated and tortuous. He therefore practised lumbar puncture in four cases and found, in fact, that the spinal fluid was under high pressure in all of them, viz., from 180 to 250 millimetres of water.

The fluid in all cases was sterile, the albumin and number of leucocytes were not materially increased. In three cases in which the blood serum caused agglutination, in one case up to 1:500, the spinal fluid did not share this quality. (The author promises a further report showing that the cerebrospinal fluid does not possess the bactericidal action of blood serum.) Brain symptoms in typhoid fever might be explained in three different ways: In the first place by a purulent meningitis with typhoid fever in the exudate; second, by direct toxic action; and third, perhaps through the action of toxines, by an intrameningeal exudation. The latter explanation is adduced by the author in his own cases, in which the cerebral symptoms were merely such as may be observed in a moderately severe case in which the diagnosis of meningotyphoid could not be made. The author also believes, however, that an acute serous meningitis is very common in typhoid fever, and he explains by this one of the most striking signs of the disease: the relative infrequence of the pulse. In all the author's cases puncture was followed by subsidence of headache, which, in some of the cases, was permanent.

Acute Leukæmia in Childhood, with Report of a Case.—McCRAE (*Johns Hopkins Hospital Bulletin*, May, 1900, p. 102) reports an interesting case of acute leukæmia in a child, the history of which is summarized as follows: "Male, aged three years; anæmia; fever; purpuric rash; blood picture of leukæmia; hemorrhages; convulsions; death; duration about one month."

The child was admitted to the Johns Hopkins Hospital on May 11, 1898. He had been fretful for a few days previous to admission. It was found that he had adenoids and enlarged tonsils. The liver was palpable 3 cm. below the costal margin. The spleen was palpable and hard, but did not extend below the costal margin. There was no general glandular enlargement. Over the sacrum there was an extensive purpuric, almost gangrenous, area. The blood examination on May 12th gave the following: Red cells, 1,680,000; leucocytes, 26,000, and hæmoglobin, 35 per cent. (v. Fleischl). A differential count of the leucocytes showed 86.5 per cent. of lymphocytes (small, 41.5; large, 45 per cent.). On May 24th, the day the child was removed from the hospital, the blood examination showed the following: Leucocytes, 21,800 per c.mm., with 98.6 per cent. of large and small lymphocytes. On May 19th the leucocytes had been 60,800 per c.mm., with 99.2 per cent. of lymphocytes. The child died on May 30th, six days after removal from the hospital. Death was preceded by epistaxis, petechiæ, and convulsions.

According to McCrae, acute leukæmia is a rare disease in the first decade, but a search of the literature shows that there are at least thirteen previously reported cases of acute leukæmia in this period of life.

Of these 13 cases 11 were in males. Fever was noted in 8 cases; general glandular enlargement was present in 4 cases, enlarged cervical glands only in 5 cases, no enlargement in 2, and no note regarding it in 2. The spleen was enlarged in all the cases. There was enlargement of the liver in 8 cases, none in 3, and in 2 the condition was not noted.

The red cells were reduced in the eight cases in which there was a record of a count being made. They ranged between 2,350,000, the highest, and 1,000,000, the lowest.

The leucocytes showed wide variation. There were counts in eight cases, the highest being 209,000 and the lowest 21,000 (McCrae's case).

The type of leukæmia was apparently lymphatic in thirteen cases, and in the remaining case no note regarding the blood is given.

As to diagnosis the disease can be recognized only by careful blood-examination. The conditions with which it is most likely to be confounded are: (1) An acute infection with specially marked throat symptoms, and (2) a hemorrhagic purpura. A possible relationship to lymphatism or a "lymphatic constitution" must also be considered. Ewing, who has also studied this relationship, thinks that there is no connection beween the two conditions.

The treatment is largely symptomatic. In no case does any treatment appear to have been of service.

SURGERY.

UNDER THE CHARGE OF

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Psychical Disturbances during Acute Osteomyelitis.—STEIN (*Prager medicinische Wochenschrift*, August 16, 1900) states that out of thirty-one cases (twenty-one males, ten females) of acute osteomyelitis that have come under his observation since 1892, three (two males, one female, all children) were accompanied by psychical disturbances. Similar disturbances of mentality may also follow malaria, acute muscular rheumatism, pneumonia, typhoid fever, or any of the acute infectious fevers. They may appear at any time during the course of the disease, and may be the result of the absorption of toxins or may indicate that the patient is not receiving the proper amount of nourishment. They are pure psychoses, and may take the form either of mania or of melancholia. Case I. Boy, aged sixteen years, who presented all the typical symptoms of acute osteomyelitis of the tibia accompanied by marked delirium. At the beginning of the third week of the disease he was somewhat better, but he soon became very violent, refused all food, tore off his dressings, and passed all his evacuations in bed. He screamed and cried the greater part of the time, and whenever his nurse left his bedside he seemed to be nearly consumed with fear. At no time could he make an intelligent answer to a question. He became fearfully emaciated, but after several relapses he slowly improved. An examination

showed the knee- and ankle-joints to be full of pus, which necessitated an amputation through the thigh above the knee. He made a good recovery, and was discharged from the hospital twelve weeks after the date of his admission. Case II. was a girl, aged fourteen years, who had acute osteomyelitis of the right tibia. She presented all the typical symptoms. A free incision to secure drainage was made over the infected area. Soon afterward she showed the symptoms of an infection of the right forearm, both wrists, and at the angle of the elbow. It was necessary to incise these in two places, and also to make another incision for drainage in the affected leg. She was markedly delirious, and there were delusions of vision and hearing She declared that her room was full of people of frightful appearance, with whom she held almost constant conversation in a most excited manner. She seemed to be in constant fear. She became extremely unclean in her habits, and fought violently on any attempt being made to clean her. Finally, it became necessary to remove her to a room by herself, where she became quiet, and melancholy succeeded the mania. She spoke but little, and spent most of the time in weeping. She asked to be placed in the room with the other patients again, but as soon as she was returned to it she became as violent as before. Finally, however, she slowly began to improve, and was quite well when discharged from the hospital eleven weeks from the date of her admission. Case III. was a boy, aged sixteen years, poorly nourished, whose delusions took the form of acute melancholia accompanied by great uncleanliness; the latter was really the most prominent symptom. He shrieked whenever anyone approached the bedside, and refused all nourishment. Examination showed the patellar reflexes to be exaggerated and ankle clonus marked. Shortly after this his parents removed him from the hospital, and the case was then lost sight of.

Mechanical Antisepsis in the Treatment of Gonorrhœa.—Kiss (*Central-blatt für die Krankheiten der Harn und Sexual-Organe*, Band xi., Heft 7) states that medicated solutions introduced into the urethra clean the same mechanically, after which they exert their chemical action on the mucous membrane. This latter effect is important, but there are many ways of showing that the mechanical washing plays the principal rôle in the cure of gonorrhœa. The copious injection of sterile water every two hours will in from twenty-four to forty-eight hours almost entirely stop the discharge and cause the disappearance of the gonococci. If this treatment is stopped the discharge reappears in twenty-four to forty-eight hours—proof that the mechanical antisepsis is an important factor. Similar results follow irrigation with ordinary pure water, which must be used copiously in order to obtain a lasting benefit. This treatment proved most efficacious in a light case of sixteen days' duration, but in three other cases of fresh infection it was inefficacious. The irrigations were given every four hours for one week, and then once daily for one week in the successful case, which was then cured. Twelve cases in the hospital were given a copious anterior irrigation once a day, and every two or three hours the patients gave themselves one or more injections, lasting five to ten minutes. All the cases improved; seven remained under observation long enough to note the permanent disappearance of the gonococci. It is not possible to speak positively of the permanent cure of

cases of gonorrhœa which were under observation for so short a time, but it is clearly demonstrated that the mechanical washing of the anterior urethra is beneficial.   It is necessary to use chemical agents in order to be able to produce thorough mechanical antisepsis, but, as is well known, not all antiseptics are germicidal to the gonococcus, while some that are the most fatal to the gonococcus are so irritating to the urethral mucous membrane as to make their use an impossibility.   It is possible theoretically to compose a solution that will destroy them, but it is often impossible to reach those gonococci inhabiting the depths of the follicles, etc.   Argentamin and protargol have been found to be very effective, but both are highly irritating. Better results have been obtained by the use of copious irrigations with a mild permanganate of potassium solution, which is not irritating, and enables one to obtain much more thorough mechanical antisepsis as well as a germicidal action, and a healing influence on the urethral mucous membrane.   After a few anterior irrigations the discharge markedly lessens and the gonococci disappear.   After irrigations with a 1 : 2000 or 1 : 4000 solution of silver nitrate the gonococci disappear from the secretion—this is partly due to the mechanical washing, but it is also due to the precipitate from the solution in the urethra which mechanically hinders for a time the appearance of the gonococci.   It is not possible to state what part the astringents will play in the treatment of the future.   The appearance of complications can in many cases not be prevented by any form of treatment, but it may be said that they are rarer in those cases treated by the application of medicated solutions.   Out of 1200 cases complications appeared in 221 before the beginning of treatment.   During the treatment only twenty-six cases developed complications (twenty-two were cases of epididymitis), despite the fact that only one-third of the cases were treated with " good " solutions.   It was not possible to tell which solution was the best in preventing complications, but it was shown that the best method of treatment of gonorrhœa is that one in which simple mechanical antisepsis can be the more thoroughly accomplished.

The Restoration of Motion after Ankylosis of the Joints.—CHLUMSKY (*Centralblatt für Chirurgie*, September 15, 1900) states that the treatment of the simple ankylosis produces but moderate benefit.   Out of fourteen cases of non-tubercular ankylosis treated in the last ten years in the Breslau Surgical Clinic there was not a single case in which there was any marked improvement.   Ankylosis consists in either a shrivelling of the soft parts or a bony overgrowth, or, more commonly, both of these are combined in a single case.   The contracted soft parts can be loosened through massage and by forced movements, but the bony ankylosis cannot be affected except by such violent force as will cause an intracapsular hemorrhage, and in the end the patient's condition is really worse than it was in the beginning, for the ankylosis recurs in a very short time.   After forcible breaking up of the adhesions in a case of ankylosis the tendency is for the condition to recur soon unless some means are taken to prevent reorganization of the tissues in a faulty position.   The best example of the introduction of a foreign body as a means of preventing bony union is seen in those cases of fracture where a small piece of muscle or fascia gets between the fragments

and causes ununited fracture. If one could imitate or counterfeit these oc-currences it might be possible to produce movement in the ankylosed joint. An attempt has been made to do this in cases of ankylosis of the jaws. After resection some of the masseter fascia was introduced into the joint with fairly satisfactory results in three cases. This method is not possible in the larger joints, because the ultimate destiny of the interposed fragment may be fatal to the further function of the joint, and, secondly, the carrying out of this method presents various technical difficulties. So the author reports his experiments with animals (dogs and rabbits), at first introducing a plate made of either celluloid, silver, tin, rubber, or gauze after a resec-tion of the joint. These results were very good, as was shown by exposing the joints at times varying from three weeks to four and one-half months after the operation. The joints contained serous fluid, the ends of the bones where the cartilage had been partially resected were covered with a thin surface of cartilage, while the bones which had been resected through the bone itself presented a smooth surface covered with connective tissue. The capsule of the joint and the ligaments were somewhat thickened. The rubber or celluloid plates lay undisturbed in position, while those that were made of tin or silver were found to be pulverized. The gauze was found somewhat wrinkled in one case. Two of the dogs died of sepsis. The re-sults, on the whole, were good, but it was apparent that the use of plates made of non-absorbable material might in time lead to serious consequences. It would, therefore, seem best in using this method on mankind either to remove the plate after a few weeks, or, what is even better, to use plates made of absorbent material, such as decalcified bone, ivory, or magnesia. The last is the best, as it can be more surely and easily sterilized, and the time of its absorption accurately computed by the thickness of the plate used. The experiments made on rabbits with this substance were most sat-isfactory, and as a result it is plain that in this difficult field there is now new hope of ultimate good results by this method of treatment.

Cocainization of the Spinal Canal.—DUMONT (*Correspondenz-Blatt. f. Schweizer Aerzte*, October, 1900) states that he has used this method of produc-ing anæsthesia in three cases, all of which were followed by such painful con-sequences that he does not recommend the procedure as now practised. Death resulted in one case, but the cocaine was only an indirect factor, for the patient was in a very weakened condition as the result of some years of illness, and the cocainization only served to hasten the end. General anæsthesia would undoubtedly have given much better results than cocaine did in the three cases. It may here be emphasized that general anæsthesia, carefully given, gives very much better results in the senile diseases than any other method. This method has also been used by physicians as a remedial measure. Thus Jaboulay injected a solution of cocaine and morphine into the spinal canal of a case of myelitis in an effort to relieve a contraction of the leg due to that disease. This was followed immediately by the legs becoming entirely "asleep," and in the succeeding eight days the patient suffered from retention of urine, etc. The same author also reports a case in which he injected the same fluid between the meninges in a patient subject to epilepsy. The result was the production of a convulsion. One cannot be

too careful to avoid such a disaster. Gumprecht has emphasized the fact that even simple lumbar puncture is not without danger. He reports seventeen fatal cases, two of which occurred in his own practice. In conclusion, it may be said that cocainization of the spinal canal is an original and interesting method of inducing anæsthesia, but there is little probability at the present time of its supplanting the usual methods of inducing general anæsthesia.

Discussion on the Present Condition of Pleuropulmonary Surgery.— DEPAGE (*Annales de la Société Belge de Chirurgie*, June, 1900) opened the discussion by stating that theoretically it is admissible that after the performance of simple thoracentesis or pleurotomy a case of acute purulent pleurisy may recover with physiological re-establishment of the pleura, but in cases of chronic empyema the conditions are different. Here the pleuræ are permanently modified in shape, physiological restitution is not possible, and recovery is attained by adhesion of the visceral with the parietal portions of the pleurisy. Thoracentesis, pleurotomy—the operations of Schede and Estlander—have here each their indications, but not one of them is sufficient for those cases of chronic pleurisy with the lung completely retracted in the costo-vertebral space. When the lung is found in a condition of complete atelectasis the best operation is to resect the clavicle and the first rib. The operation proposed by Delorme may prove successful, but it is to be remembered that the effects of this method still remain to be studied, and that the pulpification of the lung tissue will not permit this organ to expand.

DESQUIN states that he has but rarely seen the necessity to have recourse to such grave operative procedures as the methods of Schede, Estlander, and Delorme. He believes in careful drainage in all cases of purulent pleurisy, shortening the drainage-tube each day, and in from five to six weeks a cure should result; very rarely it may result in a shorter time. In children a purulent pleurisy may be cured by a single aspiration. As a rule, these cases are the result of an infection by the pneumococcus, and this is the most favorable type. He reports one case of radical cure by this method of treatment, which is an argument in favor of not completely rejecting it. He believes lavage to have its uses, and has employed a solution of chloride of zinc with good results. When the patient has a rise in temperature he employs irrigation, which is usually followed by a drop in the fever. In two different cases he has seen pneumothorax caused by the opening of the thoracic cavity. He has then maintained a sterile sponge over the thoracic opening, thus preventing the air from rapidly entering that cavity. He has found this precaution sufficient; in no case were there alarming symptoms, and as soon as the pleural cavity was closed the air was rapidly absorbed.

GALLET states that in those cases of chronic pleurisy which are the result of an acute purulent pleurisy there are three operations to which the surgeon may have recourse. The operation of Estlander gives good and durable results in the ordinary cases, but in those in which the lung is driven back into the costo-vertebral space either Schede's operation or that of Delorme is the one of choice. He is not a strong partisan of lavage, but believes in the curettage of the purulent cavity, using the blunt curette of Rheinstätter. He believes in drainage continued over a long space of time.

WILLEMS states that he believes that the traumatism resulting from the operation proposed by Depage to be beyond the powers of resistance of the patient, who is usually much weakened by the duration of the suppuration. He states that it would be more simple to resect the posterior segment of the inferior ribs and thus expose the costo-vertebral space and drain the pleural cavity. He believes that most cases of empyema are operated on too late, and that the earlier they are operated on the sooner they recover. He does not believe in performing an exploratory puncture, which often fails to show the presence of pus, but instead depends for his diagnosis upon the usual pathognomonic symptoms of deep-seated suppuration : fever, emaciation, and sweats, which he considers to be the most important symptoms. He does not believe in attempting to evacuate the pus by puncture, which accomplishes nothing more than the loss of valuable time, as the case will eventually demand thoracotomy, which is best done early. He believes it best to open the pleura through the intercostal space after resecting a segment of a rib from 3 to 5 cm. long. This best facilitates digital exploration and drainage. He states that cases of pleurotomy recover faster without irrigation than they do when it is used. He reserves lavage for those cases where fever persists and for those where the pus has undergone decomposition, which is often shown by the odor and by the pus becoming green in color. In these cases the use of hydrogen peroxide is usually attended with marked success. After the first irrigation the pus loses its odor, the green color disappears, and there is a marked diminution in the quantity. Estlander's operation is indicated in those cases where there is prolonged suppuration with permanent retraction of the lung against the vertebral column, where there is no chance of the lung again becoming functional, and where there is scoliosis. He reports two cases in which Estlander's operation was successfully performed.

DEPAGE states that Estlander's operation is indicated in those cases where the purulent cavity is of small dimensions, but that both Schede's and Estlander's operation do not cause the disappearance of the void which always exists in these cases at the top of the pleural cavity.

VERNEUIL states that when the lung is completely retracted the best operation is that of Schede, as has been demonstrated by the radiograph in the case cited by Gallet.

DEPAGE states that the radiograph may not be absolutely depended upon, as there is always some trouble in interpreting the plate in this type of cases.

VERNEUIL states that it is possible in all cases for new adhesions to exist between the two layers of the parietal pleura and so make the plate obscure.

DESQUIN states that it is questionable if lavage is a wise method of treatment in all cases. In some it is very useful and gives excellent results. It is also questionable if simple puncture cures many cases of purulent pleurisy in children.

BLONDEZ reports one case where a single puncture cured a purulent pleurisy in a child. When a physician is practising in the country, among a more or less uneducated class of people, the parents of a child with purulent pleurisy will permit a simple puncture when they would not permit a pleurotomy, so in some cases this treatment is the result of circumstances.

DEPAGE states that it is an interesting question whether or not it is possible

for a patient with acute pleurisy to recover with a complete re-establishment of the pleural cavity and without any trace of the disease.

VERNEUIL, in closing, stated that theoretically such may be the case. Lavage is indicated in certain cases, while in others it is not. Curettage is also a valuable adjunct to the treatment when indicated. It is rare that simple puncture cures the purulent pleurisy of children; usually it only causes the loss of valuable time, and the case finally demands a pleurotomy for its relief. Pleurotomy is not a more grave operation than puncture; the final result of the case depends upon the nature of the pleurisy and the powers of resistance of the patient. In a vigorous patient who has a pleurisy as the result of an infection with the pneumococcus, pleurotomy gives the best chance for recovery. The fact that a man lives in the country should not be used as a reason in favor of a line of treatment which has no other reasons to recommend it. If pleurotomy is the operation of choice it should be performed, and no unscientific considerations should modify the surgeon's judgment; but even if puncture is abandoned in the treatment of purulent pleurisy, it still has its place as an aid to diagnosis. The appearance of scoliosis after pleurotomy is usually late, and before it occurs further operative interference, such as Estlander's operation, should be performed. It is not wise to wait until the vertebral deviation has occurred. A secondary and more radical operation is early indicated if the pleurotomy has not been successful. The dangers of total pneumothorax have been greatly exaggerated, as has also been noted by Desquin. Verneuil states that he has never seen a case in which this has happened.

On the Surgical Treatment of Aneurisms by Excision.—ANNANDALE (*The Scottish Medical and Surgical Journal*, October, 1900) states that the excision method of treatment has the following advantages : (1) If the operation can be successfully performed the result is a complete cure of the aneurism. (2) The ligatures have the advantage of being applied to the ends of the divided vessels, and not to them in their continuity. (3) Even if the corresponding vein be divided and a portion of it removed the risk of gangrene is not great. (4) That in this method all the advantages of the antiseptic treatment can be obtained in connection with the successful healing of the wound and closure of the vessels where divided. (5) Inflammation and suppuration of the sac or rupture of it cannot occur in connection with this method. (6) Although as yet more experience is required, it seems likely that certain aneurisms, such as subclavian, will in the future be treated more successfully by this method.

The author believes that in the near future the treatment of all aneurisms of the limbs, whether "spontaneous," "traumatic," or "arterio-venous," provided they be tolerably circumscribed and free from complication, will be most effectively carried out by excision ; and that aneurisms of a diffuse nature, owing to rupture of the sac or from other causes, will be best treated by laying open the sac and ligating the vessel at its point of communication, either by an incision through the walls of the sac or by exposing and ligating the vessels immediately outside the sac. When possible it is no doubt advisable to excise the sac or as much of it as can be safely dissected out ; but if the sac is very adherent to the surrounding tissues it is best not to interfere with it, but to be content with securing the communicating vessels.

PEDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,
OF PHILADELPHIA,

AND

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A Study of 1778 Cases of Diphtheria.—RICHARDIÈRE reported to the International Medical Congress (*Revue mensuelle des Maladies de l'Enfance*, August and September, 1900, p. 407) a series of 1778 cases of diphtheria cared for at the Hôpital Trousseau, the diagnosis having been confirmed in every case by bacteriological examination.

Of the total number 280 died, a gross mortality of 15.7 per cent. Excluding from the statistics the cases that were fatal after less than twenty-four hours' sojourn in the hospital, which received practically no treatment, the deaths were reduced to 205, a mortality of only 11.5 per cent. Thanks to serotherapy, the prognosis of diphtheria, when operation upon the larynx is not required, has become almost benign. Thus of 1115 cases without operation there were 61 deaths, a mortality of only 5.5. On the other hand, the mortality of croup requiring operation remains high—27 per cent.

The treatment consisted of injections of Roux's serum (10 c.c. up to one year; 15 c.c. from one to two years; 20 c.c. above two years). Locally, lavage of the pharynx was made with solutions of permanganate of calcium, 1 to 4000. In the simple cases lavage and all internal treatment were withheld. There were no grave accidents imputable to the serum.

Eruptions occurred in 198 cases and followed five different types, pure or combined, namely, scarlatiniform, urticarial, roseolic, purpuric, erythematous, and polymorphous. The time of appearance after injection of serum varied from two to fifteen days. They were accompanied by elevation of temperature of from 1° to $1\frac{1}{2}$°, and almost constantly by a fetid diarrhœa of short duration. Articular complications appeared in fifteen cases, most often arthralgic only, exceptionally inflammatory. The two principal causes of death were toxicity and bronchopneumonia. Primary toxicity seemed to be rebellious to all treatment; secondary toxicity could be prevented by early employment of the serum. Cardiac failure was treated satisfactorily by sulphate of sparteine and by injections of artificial serum in massive doses. Bronchopneumonia was the most frequent cause of death. Intubation was rarely a cause, but in intubated cases the cause of death was most frequently the diphtheric infection complicated by a secondary infection. The treatment of the bronchopneumonia is unsatisfactory. In three series of cases treated respectively by cold baths, warm baths, or without bathing the percentages of mortality were about equal.

The complications most frequently observed were suppurative sub-maxil-

lary adenitis and otitis. Other complicating conditions noted were : abscess of the mediastinum, œdema of the glottis, gangrene of the larynx, endocarditis, cerebro-spinal meningitis, pleurisy, icterus, eclampsia, and nephritis. There were fifty-one cases of paralysis, most frequently localized to the uvula, rarely generalized. In two cases the paralysis, of hemiplegic type, was due to a lesion of the brain.

Diphtheria complicating other infections was particularly grave. In twenty-five tuberculous cases the mortality was 21.

Bacteriologically the long bacillus was found in one-quarter of the cases, and the medium and short in the other three-quarters. Streptococci were observed almost constantly in the cultures, whence the author concludes that the simultaneous presence of diphtheria bacilli and streptococci is without prognostic significance.

A Lymphatic Anæmia Met with in Children.—ALEXANDER MACGREGOR (*The Lancet*, September 29, 1900, p. 931) calls attention to a form of anæmia which he believes has not been hitherto described, and which in his experience is not uncommon in children, but is never met in the adult.

The signs and symptoms are so characteristic that it cannot be mistaken for any other form of anæmia or affection of the lymphatics. Of twenty-three cases of which notes have been preserved the ages ranged from three to sixteen years, and eighteen of these patients were between three and eleven years of age ; nineteen were boys and four girls. In no case was there a history of an acute stage or sudden onset. The disease runs a very chronic course, and recovery is the rule. The history of the cases shows that the glandular affection is in no way connected with those enlarged glands which usually become (or are from the first) tuberculous, and the characteristic adenitis and the chronic course distinguish it from glandular fever. The anæmia may or may not be very marked ; the adenitis is always marked, but it is easily overlooked, because none of the glands are large enough to attract the eye. The glands are small and hard, and they are always numerous in the cervical triangles and in the groins. The axillary glands are never affected. That the bronchial glands are frequently, if not always, enlarged one may safely infer from the fact that cough is in many cases a troublesome symptom when there is nothing in the lungs to cause it. The mesenteric glands are probably also affected, but abdominal symptoms are rare. The spleen is distinctly increased in size in a large proportion of cases. Catarrhal pneumonia of one or both bases is not uncommon ; in one case there was pleural effusion, and in another well-marked signs of thickened pleura.

The blood shows a decrease of the red and a large increase of the white corpuscles, and of the latter the increase of the large uninucleated corpuscles is very striking. The lymphocytes form from 12 to 13 per cent., the large uninucleated from 20 to 39 per cent., the multinucleated from 41 to 63 per cent., and the eosinophiles from 2 to nearly 7 per cent. The increase of the large uninucleated corpuscles from 6 (normally) to 39 per cent. is thus seen to be very marked. In two cases the multinucleated and the large uninucleated corpuscles were present in practically equal numbers, and very few small lymphocytes were seen.

There is always a history of gradually failing health, listlessness and fatigue, loss of flesh, and anæmia. Cough is frequently troublesome, and is usually worse at night. Appetite is poor, but the tongue is clean, and the bowels constipated.

Arsenic and iron are naturally suggested, and, with cod-liver oil, produce satisfactory results. Improvement is slow in all cases, and the glandular enlargements gradually disappear. In none of the cases observed has local or general tuberculosis resulted. The cough is a troublesome symptom and yields slowly to the treatment.

Morphine Poisoning in an Infant Successfully Treated with Potassium Permanganate.—JOHN A. BARKER (*New York Lancet*, July, 1900) reports a case of poisoning in an infant four days old, which had been given one-fourth of a grain of morphine by mistake. The infant was found in stupor, cyanotic, with cold skin, dilated and insensible pupils, slow stertorous breathing, and a pulse so feeble that it could not be counted. Two grains of permanganate were given by hypodermatic injection, heat was applied to the surface, and artificial respiration performed. A few minutes after this violent convulsions began, and although breathing was imperceptible, a second hypodermatic injection of the permanganate was given and the Schultze method of artificial respiration was continued. After about five minutes breathing was noticed and the pulse could be felt. Coma continued for half an hour, and a third dose of permanganate was given. Improvement rapidly ensued, and recovery was complete.

The Diagnostic Importance of the Meningococcus Intracellularis.— LOUIS FISCHER (*Pediatrics*, October 15, 1900, p. 290) calls attention to the fact that the toxin of the meningococcus of Weichselbaum is distinctly less virulent than that of the streptococcus, pneumococcus, bacterium coli, or the influenza bacillus. Many cases of epidemic cerebro-spinal meningitis recover, even though the disease assumes a purulent character, while the meningitis resulting from otitis media always terminates fatally, and almost an equal fatality attends sporadic meningitis of purulent type due to one or other of the organisms mentioned. An important point to remember in differentiating the epidemic form from the sporadic form is that the duration of the epidemic is always very lengthy, lasting weeks and frequently months ; the sporadic type ends fatally in about four or five days.

Heubner lays great stress upon the value of lumbar puncture in the epidemic form of cerebro-spinal meningitis. Heretofore the only means of distinguishing the purulent form from the tuberculous during life has been by the character of the fluid aspirated from the spinal canal. The bacteriological examination, however, is conclusive, and is easily made. A pure culture is obtained by inoculating the surface of agar with the aspirated fluid. It grows very rapidly, yielding a yellowish growth, shining and having a slime-like character. A smear from the pure culture is then taken and stained with Ziehl's solution.

The author quotes from Councilman, who states that an examination of the spinal fluid should be made in every case ; he believes that "all infections of the meninges other than that by the diplococcus cellularis are fatal,

but this can be determined only by microscopical and bacteriological examination of the exudation obtained during life by spinal puncture. If tubercle bacilli, pneumococci, or streptococci are found with the evidence of meningitis in a case which recovers it would settle the point."

The Cure of Hernia in Early Infancy without Operation.—TAILLENS (*Revue Médicale de la Suisse Romande*, August 20, 1900, p. 423) bases a study under this caption upon the results observed in the non-operative treatment of hernia in infants under two years of age in 81 cases in the Out-patient Department of the University of Lausanne. Of this number 53 had inguinal herniæ and 28 umbilical, divided as to sex between 58 males and 23 females. The preponderance of males followed the law observed in adult life, which is conditioned by the greater frequency of inguinal herniæ among male patients.

Of the 53 inguinal herniæ 34 were on the right side and 19 on the left. At both extremes of life the right side thus seems to be more susceptible to inguinal hernia than the left, and since in infancy it is not possible to attribute this preponderance to the violence of efforts made with the members of the right side, the cause must be sought in other conditions, probably embryologic or hereditary, exercising their influence at all epochs of life. Perhaps the fact that the right testicle descends after the left has some importance in this regard, since the closure of the peritoneo-vaginal canal at birth or shortly after would thus be less firm than on the opposite side.

Among the exciting causes phimosis is especially mentioned, being noted 28 times among the 58 herniæ in boys—a proportion of 48 per cent. The phimosis need not be complete; when it is the percentage is very much higher, as has been pointed out by Schmidt, Berger, and Broca. The action of phimosis is evidently explained by the secondary dysuria depending upon mechanical obstruction or irritation of the prepuce and glans produced by retention of smegma mixed with urine.

Despite the disadvantages attending an out-patient service among the children of the poor, the author reports 67 of his 81 cases cured by use of the bandage; of the 14 cases not cured 9 were subsequently operated upon, and 5 remained in the same condition. The cases tabulated were first seen between 1893 and the end of 1897, and all were re-examined about the end of 1899, a period varying from two years for the later cases to seven years for the earlier cases. Six of the cases, 5 of inguinal and 1 of umbilical hernia, obtained spontaneous cure without any form of treatment. In the cured cases the bandage was worn from a period of one day to one month in 6 instances, from one to two months in 8, from four to six months in 11, and more than six months in 14. Failure in the uncured cases was attributed, first, to neglect of the parents, and, secondly, to the unfavorable character of certain herniæ in early life, either because of their great size or owing to complicating circumstances, such as diseases causing frequent cough, a bad state of nutrition, or defective formation of the inguinal canal.

In patients under one year of age the strong pressure produced by the spring truss cannot be used; in these cases the rubber bandage with an airpad is available. Ordinarily the double bandage gives better results, even when one size only is affected. For infants over a year old the spring truss

may be employed when it is well borne. For umbilical hernia the usual dressing of a compress retained by a band of adhesive plaster generally suffices; or, if this fails, an elastic bandage of rubber should be used.

The Value of Koplik's Spots in the Diagnosis of Measles.—Further testimony to the diagnostic value of Koplik's spots is offered by the recent Yale thesis of WILLIAM J. MARONEY (*Yale Medical Journal*, October, 1900, p. 133), who reports a study of 140 cases of measles observed at the New York Foundling Hospital. In 53 cases the spots were noted at the beginning of the eruption, a large majority of these patients having been examined for the first time after the appearance of the eruption. In 51 cases the spots were observed twenty-four hours before the appearance of the eruption; slight fever, ranging from 99° to 101° F., was present in all, and slight coryza and conjunctivitis in 35. In 20 cases the spots were seen forty-eight hours before eruption, and slight fever but no coryza was noted; while in 4 cases they were detected three days and in 2 cases four days before the rash, slight fever being noticeable, without catarrhal symptoms. Spots without eruption were observed in two very delicate children, but the patients undoubtedly had measles and died in a few days without development of the rash. No spots were observed in 8 cases, in 4 of which the children were marantic, with very dry mouths.

The author points out that some elevation of temperature was observed in all cases showing the spots, and he considers this condition as almost necessary for positive diagnosis. Another fact to which attention is drawn for the first time, is that the spots are seldom recognized in the mouths of marantic children; which is ascribed to the dry condition of the mouth in such cases, or to the fact that these children do not react well to the infection.

[Dr. Maroney's experience adds further convincing testimony to that already adduced in reviewing the observations of recent Continental writers in abstracts published in this department in the issue of December, 1900. —ED.]

Pathological Alterations of the Gastro-intestinal Mucosa in Primary Atrophy.—FEDE, of Naples, in a communication to the Thirteenth International Medical Congress (*Revue mensuelle des Maladies de l' Enfance*, August and September, 1900, p. 400) reports a study of the anatomo-pathological changes artificially produced in the digestive tract of puppies rendered atrophic by different diets. He is thus led to distinguish in the human infant a primary athrepsia produced by insufficient, bad, irregular, or premature feeding from a secondary athrepsia caused by tuberculosis or other profound alterations of the digestive apparatus, by hereditary syphilis, and also by divers cachectic maladies.

Five series of experiments were made with different diets so as to produce an atrophy comparable to that seen in young infants. The gastro-intestinal alterations were then studied.

In the five series the results obtained were constantly the same, and, as compared with the organs of normal animals, showed thinning of the gastro-intestinal walls and an atrophy of the tissues with diminution of the cellular protoplasm.

The researches confirm the position held by the author for several years, namely, that in infantile atrophy or the athrepsia of Parrot there is encountered only thinning, and sometimes a catarrhal process of the intestinal canal, but never destruction of glands or villi. In the cases in which these destructions have been found by various observers, and most recently by Cornélia de Lange, the condition is a secondary atrophy, and not primary. In a certain number of cases it is probable that the lesions which have been described are produced by cadaveric putrefaction.

Suppurative Meningitis Due to the Bacterium Lactis Aerogenes.— SCHEIH (*Prager medicinische Wochenschrift*, 1900, No. 15) publishes an interesting observation of an infant dying at the age of eight days with symptoms only of congenital debility, a diagnosis that was all the more reasonable since the child was one of twins. At the autopsy was found a purulent infiltration of the pia and bilateral suppurative otitis with fibrinous false membrane in the left ear. The mucosa of the nose and of the cavities of the face was found to be normal, and no disease was observable in the lungs or other organs.

The bacteriological examination of the pus of the meninges and of the ears, as well as that of the nasal mucus, showed the existence of a bacillus which was identified as the bacillus lactis aerogenes. Inoculations made upon white mice and rabbits showed that the organism was excessively virulent for these animals.

The bacillus lactis aerogenes, discovered by Escherich, was considered by this observer a normal habitant of the intestine like the coli bacillus. Later Czerny and Moser found it in the blood of nurslings affected with fatal gastro-enteritis. It has also been observed in certain cases of cystitis and pyelonephritis.

THERAPEUTICS.

UNDER THE CHARGE OF

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Nectrianine.—MM. MONGOUR and GENTES have made use, by subcutaneous injection, of the soluble products of *Nectria ditissima*—the parasitic fungus of tree-cancer. Four patients in the last stages of cancer—uterus and vagina, uterus, epithelioma of the tongue, and tumor of the bladder— have been under observation. The conclusions are : (1) That the injections are without danger. 2. They do not arrest the evolution of the neoplasm.

3. They do not prevent formation of metastatic tumors or modify the glandular lesions. 4. In all cases the disease follows its normal course to final cachexia. 5. The stoppage of the injections corresponds in a certain number of cases with a subacute evolution of cancerous processes. 6. With the majority of patients the injections suppress or diminish the hemorrhages and fetid discharges, and they are especially valuable for the relief of pain, being even superior to morphine.—*Le Bulletin Médicale*, 1900, No. 56, p. 651.

The Specific Treatment of Croupous Pneumonia.—DR. WILLSON O. BRIDGES would rely upon guaiacol or salicylates, giving preference to the former when the disease is past the stage of congestion in the enfeebled or when there exist heart lesions. The addition of strychnine to the salicylate treatment obviates in part the depressant effect upon the heart, and so does alcohol. Strychnine is also combined with guaiacol for its influence upon the nervous system and to prepare patients for large doses, should these be necessary. Venesection is advised if the right heart be overloaded and threatening symptoms arise; digitalis is reserved for an irregular and flagging heart; codeine in small doses for the relief of pain and delirium; calomel and a saline for constipation or sluggish portal circulation; oxygen gas is commenced at the first sign of cyanosis and administered in quantity sufficient to relieve. The absolute recumbent position must be maintained until resolution is established.—*Journal of the American Medical Association* 1900, vol. xxxv., p. 74.

The Use of Drugs in Tuberculosis.—DR. THEODORE POTTER states that at the present time we fasten our hopes and our reliance upon creosote. Formerly his practice was to administer rather large does—twenty to forty drops—but at present one-half of this is considered sufficient. It is best administered in capsules, to be filled by the patient at the time of taking. A little milk taken just before them will make them easier to swallow and will, in a large measure, prevent the disagreeable burning sensation should any of the medicine come in contact with the mucous membrane of the mouth or œsophagus. Often the patient is directed to take a glass of milk, or even two, while taking the capsule. Clinical experience shows that the judicious administration of this drug is frequently followed by an increased appetite and digestion, and with this comes improved nutrition, increase of strength, increased resisting power, retardation of the local disease, and usually diminution of the secondary symptoms and lesions resulting therefrom. Guaiacol has been used chiefly as an external application.—*Journal of Tuberculosis*, 1900, vol. ii., p. 224.

The Silver-injection Treatment of Pulmonary Consumption. — DR. THOMAS J. MAYS has for nearly ten years injected silver nitrate over the vagi of the neck, with a view of producing counter-irritation over these nerves and thereby enhance the resisting power of the lungs. Five minims of a 2.5 per cent. solution of silver nitrate injected at a point immediately over or slightly behind the pulsating carotid in the region of the neck, preceded by a similar dose of cocaine hydrochlorate through the same needle, will produce the requisite degree of irritation. The skin is lifted between

the thumb and the forefinger of the left hand and the needle just pushed through the skin. The local visible effects show themselves in nodular (sometimes in diffuse) swelling, and in redness and pain, but these are not marked. Most of the injections should be made on that side of the neck below which the affected lung is situated, and should be repeated about once in a week or ten days. The results obtained in more than one hundred and fifty instances showed that the injections greatly, and sometimes entirely, relieve the cough and expectoration in a very short time ; that they check vomiting, improve the appetite, increase the general strength, ameliorate the physical signs, suppress the fever, abate night-sweats, and in some patients produce a striking increase of weight. The best effects are found in incipient and moderately advanced disease, although they are not without benefit in far-advanced cases. The theory of this method is based on the observed facts : (1) That agents and measures which give the best results are those which influence the nervous system, and (2) every influence or agent which has the power of undermining the integrity of the nervous system has also the power of generating pulmonary consumption or some other form of pulmonary disease.—*The Virginia Medical Semi-Monthly,* 1900, No. 6, p. 190.

[Although this method, in conjunction with others, is capable of benefiting patients suffering from chronic pulmonary disease, it is not likely that the premises will be accepted as they are here presented.—R. W. W.]

Treatment of Whooping-cough by Injections of Gomenol Oil.—DOTT. ALDO TOZZI reviews the literature. This substance is a terpinol derived from the *Melaleuca viridiflora,* and in a 20 per cent. solution is injected deeply into the gluteal region, commencing with a small dose (thirty minims) and not exceeding two drachms. The injections are but slightly painful ; it is rapidly absorbed and does not produce reaction under antiseptic precautions. Its primary action is sedative, and after a short time the number and severity of the paroxysms diminish ; the vomiting ceases after the third or fourth injection. The secondary bronchitis and cough are equally benefited, but persist for ten to fifteen days after the cure. The appetite, weight, and strength are increased. The injections should be made every day and continued for four or five days after the entire disappearance of the paroxysms.—*La Riforma Medica,* 1900, No. 156, p. 70.

Demorphinization by Means of Heroin.—M. G. KANDEL, in reporting a successful instance of this method, expresses his astonishment that a relatively small dose, even half a grain, cannot only diminish, but even prevent, the suffering which follows the cutting off of morphine. In rapid withdrawal of morphine this substitute is efficacious. It is certainly preferable to the method of Erlenmeyer, in that in place of diminishing quantities of morphine this drug is substituted, and the patient thus escapes the suffering. With this the inconveniences of morphine, it is claimed by some authors, are avoided ; but here skepticism may be indulged in. However, habituation and influences upon the digestive and sexual organs are certainly less.—*Nouveaux Remèdes,* 1900, No. 13, p. 294.

Duboisine in Mental Diseases.—DR. G. LALAUNE concludes that this substance, as the sulphate, (1) when administered by the mouth produces

hardly appreciable effects; but to produce results it is necessary to give doses which may not be without danger. (2) It is necessary to be sure that the preparation in unchanged; colored glass is essential to prevent chemical change. (3) It acts as a sedative for physical agitation, but not for intellectual excitation; the former is promptly and durably influenced. (4) The daily dose should not exceed one-fortieth of a grain, and the patient should be watched until all danger of poisoning is passed. (5) The remedy should not be used unless there is at hand a solution of pilocarpine nitrate or hydrochlorate, which will facilitate its elimination should symptoms of poisoning arise.—*Journal de Médecine de Bordeaux*, 1900, No. 23, p. 413.

Treatment of Epilepsy.—Dr. DAVID INGLIS states that when epileptic patients are seen early they should receive sufficient bromide to control the attacks readily, and it is very advantageous to combine with it at the outset a moderate amount of chloral. The bromide then should be gradually diminished to the smallest dose which will keep down the convulsions. If, in spite of the careful and persistent use of the bromide, the fits continue, then recourse should be had to acetanilide, of which for an adult five grains three times a day is an ample dose. Not infrequently three grains at the same interval will be found sufficient, and even this amount may be gradually diminished. Further, it seems to be of importance that the patient should be set at bodily labor of a vigorous sort and sufficient in amount to bring about the complete oxidation of his food-products, and to stimulate in nature's own way all of the excretions. The diet should be restricted; not an exclusive vegetable diet, but meat and eggs are the kinds of food of which epileptics ought to eat very little, if any.—*The Physician and Surgeon*, 1900, vol. xxii., p. 327.

The Antagonism between Cocaine and Hypnotics.—DOTT. GIOFFREDI has observed that with small but not fatal doses of cocaine and chloral hydrate there is a complete and reciprocal antagonism in the sense that one drug neutralizes the action of the other, but this cannot be said of large and fatal doses. But in considering fatal doses there is a unilateral antagonism in that chloral hydrate and other hypnotics are able to compensate for and neutralize fatal doses of cocaine, but the reverse is not true. This antagonism is shown in the nervous, vascular, and respiratory systems and temperature effects, but in large doses the action of the hypnotics always prevails.— *Rivista Critica de Clinica Medica*, 1900, No. 5, p. 117.

Orexin Tannate in Anorexia.—Dr. T. W. P. SMITHWICK announces that this is the best remedy for anorexia occurring in children, on account of its easy administration. For adults six grains should be given one hour before each meal; for children the dose should be decreased according to age. When administered to convalescents it increases the appetite, aids digestion and assimilation. In all cases—even of tuberculosis—the body-weight increases. The length of time required for treatment is variable, depending upon the individual characteristics of the patient and the origin of the trouble. In simple atonic dyspepsia it was not necessary to continue it longer than three weeks; in anæmia four to six weeks; in phthisis (four patients)

two were treated for six weeks each, and now two months have elapsed and they are doing well, while in the others the disease was further advanced and they are still under treatment, gaining about one pound in weight each week.—*Merck's Archives*, 1900, No. 3, p. 88.

Carrasquilla's Serum Treatment of Epilepsy.—MR FRANK TIDSWELL was engaged for nine months in testing this method. Two patients were treated patiently, perseveringly, and continuously during this period, but not the slightest improvement was noted; but, on the contrary, the disease continued to progress in both patients. The report closes with the citations from current literature showing that others have failed, and their results have been of a uniformly discouraging nature.—*Intercolonial Medical Journal of Australasia*, 1900, vol. v., p. 233.

Peronin.—DOTT. FERDINANDO BATTISTINI finds that while this substance resembles codeine in its absence of hypnotic effect and in large doses giving rise to convulsions of bulbo-cerebral origin, on the other hand, it acts in a quarter of the dose of the latter, and should be considered as a heart-poison. It diminishes cough by lessening the sensibility of the bronchial mucous membrane. Locally it is anæsthetic (rabbits) in 1 per cent. solution when instilled into the conjunctival sac, and does not produce cloudiness of the cornea, but in man it produces abundant lachrymation, marked conjunctival injection, and chemosis. In daily doses of about a grain it produces regular and deep sleep in paralytics during the period of excitation, and even can be classed with paraldehyde, chloral, and morphine in intensity of action. Its untoward effects have received much attention; danger to the heart, profuse sweating, intense headache, itching, nausea, dryness of the throat may result, and in general various forms of malnutrition, as catarrhal and tuberculous affections of the larynx, bronchitis, and pulmonary diseases are contraindications to its use. The ordinary dose is about double that of morphine, the maximum daily amount being two and one-half grains.—*Rivista Critica di Clinica Medica*, 1900, No. 4, p. 103.

Pathology of Lobar Pneumonia as a Basis for Treatment.—DR. J. K. CROOK believes that in the near future we may have an antipneumotoxic serum to combat inflammations of the lung due to the pneumococcus. At present results are not satisfactory, and the older expectant methods of treatment are advised. The writer considers *seriatim:* 1. Calomel. Large doses, twenty to sixty grains, may be given at the outset of the disease to render the exudate derived from the blood unfit for sustaining microbic life. Of thirty grains administered perhaps five enter the blood as a soluble albuminate. Here a still smaller quantity is converted to the perchloride—more than a third of a grain cannot be tolerated. It is known that the mercurial solution quickly disappears, for it is soon found in the urine, bile, etc. The antiseptic is in a very attenuated form when it comes in contact with the micro-organisms. Whether it still possesses power as a germicide is an open question. 2. Quinine. Within six hours half of the exhibited dose is eliminated by the urine. It is a powerful antiseptic, and it has been shown that a 1 per cent. solution is fatal to the diplococcus pneumoniæ in five minutes.

As to its influence on the microbe in man, whether it disqualifies the blood for supplying a culture for the organisms, or whether it acts directly as a germicide, nothing is known. 3. Salicylic acid. Mention is made of recent exceedingly favorable reports (Schering, Liegel) ; the writer has found only a slight lowering of the temperature and increased expectoration. There was no influence over the usual course of the disease. There are no researches to show that the salicylates exert any influence on the pneumococcus in the living body. 4. Chloroform is useful for its sedation of the nervous system and its anti-coagulating influence on the blood. Given by inhalation its fumes are brought into close contact with the pneumococci when used early, before the small bronchi are blocked by exudate. Its effect on the germs is also unknown. 5. Creosote is largely excreted by the lungs, and is thus brought into direct contact with the bacteria ; there are no data concerning its action on the germs, and the same is true of carbolic acid. Conclusions are : Recognition of a pathogenic microbe increases the hope that an efficient antitoxin may be discovered. The use of antiseptics for the destruction of pathogenic organisms in the tissues is very limited. Pneumonia is a self-limited disease with a tendency to recovery if the patient can be kept alive for a few days. While new germicidal remedies may be tried, they should not as yet supersede an intelligent form of expectant treatment, which results in a far lower mortality than attempts to abort the disease.—*Medicine*, 1900, No. 4, p. 277.

A Comparative Study of Digitalis and its Derivatives.—DR. JOHN P. ARNOLD and HORATIO C. WOOD, JR., have made a careful review of the literature and performed some laboratory experiments, from which they draw the following conclusions: (1) Digitalin and digitoxin each represent the full circulatory power of digitalis. (2) Digitalis, digitalin, and digitoxin stimulate the cardio-inhibitory mechanism, both centrally and peripherally ; in larger doses they paralyze the intrinsic cardio-inhibitory apparatus. (3) They all cause a rise of blood-pressure by stimulating the heart and constricting the bloodvessels. (4) Very large doses paralyze the heart muscle of the mammal, the organ stopping in diastole. (5) Digitoxin is not to be recommended for human medication on account of its irritant action, which makes it liable to upset the stomach when given by the mouth, or to cause abscesses when given hypodermatically, and, on account of its insolubility, which renders it slowly absorbable and irregularly eliminated, having a marked tendency to cumulative action. (6) Digitalin of a particular manufacturer has been found to be a stable compound, one grain being equivalent to about one and one-fifth drachms of tincture of digitalis.—*Merck's Archives*, 1900, No. 9, p. 351.

Thyroid Extract in Psoriasis.—DR. LEONARD WEBER reports that a nervous young woman, with uric-acid and rheumatic symptoms, received one five-grain tablet of this substance thrice daily for two months ; at the end of this time all the areas of eruption (some fifty or more) had disappeared. The only local treatment was the application of a 25 per cent. aristol ointment. Four months after stopping the remedy no relapse had occurred.—*The Post-Graduate*, 1900, No. 9, p. 1103.

Sarcoma of the Nasopharynx Cured by Injections of Formalin.—DR. JOHN A. THOMPSON reports that the nasopharynx of his patient was filled with a red tumor which was attached to the posterior wall. Microscopical examination of a detached portion showed it to be a round-celled sarcoma. Twenty-five minims of a one-half of 1 per cent. solution of formalin were injected into the tumor twice each week. Six weeks later, the mass having become less vascular, part of it was removed by post-nasal forceps; later, the remainder was removed after further injections. Six months later there was no return of the growth.—*The Laryngoscope*, 1900, vol. ix., p. 193.

Treatment of Malignant Pustule with the Serum of Sclavo.—DOTT. ADOLFO LISCIA reports two successful instances of the use of this serum. In both the improvement was rapid after a dose of from two to ten drachms. —*Gazetta degli Ospedali e delle Cliniche*, 1900, No. 87, p. 898.

Treatment of Uræmic Intoxication.—DOTT. A. COMINELLI notes that there is a marked distinction to be made between the acute and chronic forms, and that the latter is to be considered as an intoxication. With sodium salicylate given hypodermatically in doses of from five to six grains a notable rise of temperature occurs and the uræmic phenomena disappear. —*Gazetta degli Ospedali e delle Cliniche*, 1900, No. 69, p. 733.

Hæmaturia.—DR. SCHWABE reports a single instance of the successful use of gelatin. A solution of 2 per cent. of gelatin in physiological salt solution was heated to 212° F. and allowed to cool. About six drachms, at body temperature, were injected, with antiseptic precautions, under the right and left clavicles. For the next eight days the patient took *per os* a pint of a 10 per cent. gelatin solution. Hemorrhage began to diminish immediately after this injection and practically ceased five days later, although three days more were required for its entire disappearance.—*Therapeutische Monatshefte*, 1900, Heft 6, S. 311.

Toxicology of Potassium Chlorate.—DR. S. J. MELTZER analyzes the existing experimental data and reports some new facts. From these he concludes that this substance is a strong poison for the nerve cells, which are at first intensely excited and then paralyzed by it. May we not also assume that by introducing this poison into the circulation a certain amount of it reaches the brain, especially the respiratory centre, in a concentration sufficient to excite and paralyze it? Although we must admit that the solution injected into the brain contained a greater percentage of the salt than the blood of the animal poisoned by it ever contains, we must also admit that the circulation reaches the cells of the respiratory centre in a far more intimate way than can be accomplished by our crude methods of simply injecting into the brain, where, according to Bruns, the liquid mostly remains on the surfaces of the ventricles.—*Therapeutic Gazette*, 1900, No. 7, p. 433.

[This paper is useful, because it throws additional light upon the causes of various symptoms; still more evidence is required before the complete toxicology is understood.—R. W. W.]

Marked Poisoning from Five Grains of Quinine.—DR. FRANKLIN W. BOCK reports that a patient received five one-grain quinine pills, one to be taken every hour. In three hours there was a very marked roaring in the ears, and deafness followed, with intense headache and grippy pains in the bones. Two days later extensive erythema of the face followed, somewhat resembling erysipelas, and, later, symptoms of collapse appeared. At times there was muttering deiirium. Convalescence was slow, and at the end of four weeks it was found that the patient's hearing was reduced about one-half.—*Merck's Archives*, 1900, No. 8, p. 315.

An Improved Method of Using Gelatin in Hemorrhage.—DOTT. F. S. RACCHI believes that ten drachms of a warm 2 per cent. solution of gelatin in normal serum injected into the rectum is more rapidly absorbed than if given hypodermatically. Its action is manifest in from five to ten minutes and lasts about six hours.—*Gazetta degli Ospedali e delle Cliniche*, 1900, No. 114, p. 1199.

Ichthoform.—DR. HUGO GOLDMAN reports upon this remedy, which is a combination of ichthyol and formaldehyde. This occurs as a dark-brown powder, smelling and tasting of ichthyol, completely insoluble in water, hardly soluble in ether and chloroform, and forming an emulsion with glycerin. It inhibits the development of the colon bacterium, typhoid bacillus, and staphylococcus pyogenes aureus. Internally, as an antibacterial, antifermentative, and deodorizing remedy in various disorders of the alimentary tract, its use has been successful. Generally as much as can be placed upon the point of a knife with an equal quantity of sodium bicarbonate taken after meals, three times daily, has been sufficient. Even in intestinal tuberculosis it is beneficial. It is apparently a safe remedy, inasmuch as it has no effect upon the nervous system and does not irritate the kidneys. The amount of indican excreted in the urine is sensibly decreased. The results of its use in external wounds demonstrates its antiseptic properties.—*Centralblatt für die gesammte Therapie*, 1900, Heft 9, S. 513.

The Treatment of Whooping-cough.—DR. J. W. WILTEE recommends quinine as an acidulated solution. An application to the glottis, following Moncorvo, of a one-third of 1 per cent. solution of resorcin every four hours during the day, and when possible once or twice during the night, is often useful. The original method called for the application of a 10 per cent. solution of cocaine previous to the use of resorcin, but this should be omitted, because it often gives rise to spasm of the glottis (Roskam).—*Albany Medical Annales*, 1900, vol. xxi., p. 535.

The Continuous Use of Digitalis.—DR. J. GRŒDEL believes that there is no more difficult question to determine than the advisability or non-advisability of permitting digitalis to be taken for a considerable period without interruption. Many years' practice of the giving of digitalis uninterruptedly has very often resulted in great benefit. In the majority of heart diseases there comes a time when we can no longer succeed in producing lasting compensation by means of repose and dietetic rules, baths, and gymnastics, or

even by a short course of medicine. At ever-decreasing intervals we must have recourse to the various acknowledged remedies, and, above all, to digitalis. Some patients lead a comfortable and endurable life for only a few days after the completion of the digitalis course; then it quickly passes off, and we are obliged again to resort to digitalis, eventually combined with other drugs, to save life. By thus giving digitalis intermittingly, and if possible anticipating these periods of heart weakness, the patient may be kept in a comfortable condition. Sometimes the interval between these periods may be lengthened by replacing this drug by continuous doses of other heart remedies, as strophanthus or caffeine. Should these fail, the continuous digitalis treatment should be instituted. Objections to this plan are cited as follows: (1) Cumulative effects. Of these the author admits the existence, but states that he has only rarely seen instances of violent toxic symptoms resulting from cumulative effects, which, however, never lasted long and did no permanent harm. These can be guarded against by omitting the remedy, or avoiding the danger by observing the diuresis and stopping the remedy so soon as there is a marked diminution in the amount of urine. (2) A continuous use of digitalis is said to produce a rapid decline in strength, wasting, and destruction of tissue. This is emphatically contradicted by the author. (3) The body becomes inured to the remedy, which gradually loses its effect. This is believed to be erroneous. Nor, indeed, can the digitalis habit be formed. As to the forms of cardiac disease in which this method may be recommended, mitral insufficiency is first mentioned. In heart diseases the result of overexertion, when small doses cease to have a satisfactory effect, a slight increase may be advantageous. If this fails some other remedy should be substituted, and on returning to digitalis large doses may now prove efficient. In the last stage only of arterio-sclerosis, when the high vascular tension has passed away, the small, continuous doses may be decidedly useful. In conclusion, when physical and dietetic means of treatment fail, recourse is had to digitalis, using it with care, very sparingly, and at as long intervals as is possible. When this method becomes a comparative failure the continuous digitalis treatment is resorted to, which, when all other treatment was useless, has produced in many cases a satisfactory result.— *The Practitioner*, 1900, No. 382, p. 380.

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Formalin in Ophthalmology.—Dr. EDWARD S. LANDER prefers the solution of the strength of one to two thousand. This is very useful in mucopurulent and follicular inflammation of the conjunctiva. For purulent conjunctivitis (ophthalmia neonatorum) a stronger solution may be used at first until the discharge begins to decrease in amount. In blennorrhœa of the lachrymal sac formalin is more satisfactory than silver nitrate. For infected ulcerations or abrasions of the cornea the wound may be touched once daily with a solution as strong as one to five hundred or even two hundred. All solutions of a strength under one to four thousand cause smarting, but this is less intense and of shorter duration than that caused by silver nitrate. In a solution of one to two or three thousand it is used to disinfect the skin of the lids and eye-lashes prior to operation; for clearing the conjunctiva one to four thousand is preferable.—*Cleveland Medical Gazette*, 1900, vol. xv., p. 619.

Digitalis in Heart Disease.—DR. R. C. PEACOCKE accepts the prevailing view that the drug acts on the heart through its effect on the muscular tissue, only slightly influencing the vagus nerve. Each muscle fibre becomes more elastic, extending more completely, and increasing its contractility, hence both diastole and systole are more deliberate, and the latter more forcible (Schmiedeberg). Threatened heart failure, due to inefficient ventricular systole, demands digitalis, and this holds true whether the condition be primary or secondary to some acute process, as, for example, pneumonia. Beneficial effects of digitalis are best observed in mitral disease, with small, frequent, irregular pulse, and cardiac dropsy. In dilated and flabby (fatty) heart, with soft and intermittent pulse, such as is often seen in the aged, digitalis is excellent. Smaller doses suffice; five to fifteen minims of the tincture twice or thrice weekly may be given for several months continuously. In uncomplicated aortic stenosis the writer advocates its use (?). Where there is either double aortic disease it is generally indicated, though there are instances of sudden syncope following. Moderate prolongation of diastole may give time for regurgitation of sufficient blood into the ventricle to cause increased embarrassment or even fatal over-distention. When in doubt, the pulse is the best guide; if it be between 60 and 70 beats, digitalis is contraindicated. Arterial spasm (increased tension?), even when a water-hammer pulse exists, also contraindicates digitalis. Clinically, there are very many instances in which, despite theoretical objections, digitalis is beneficial in aortic regurgitation. It is advisable, first, to try the effect of nitroglycerin. In flabby heart, due to alcoholism, digitalis acts well both as a cardiac tonic and also by counteracting the effects of other sedatives required by the alcoholic state.—*The Dublin Journal*, 1900, No. 340, p. 256.

The Alleged Cholagogue Action of Methyl-violet.—DOTT. A. G. BAR-BÉRA records his observations made upon dogs with complete and permanent biliary fistula, this substance being administered by the mouth. His conclusions are : (1) It is eliminated in part in the bile; (2) it diminishes the quantity and solids of the bile produced by the liver ; (3) it changes the color of the bile from a pale to a deep violet.—*La Riforma Medica*, 1900, No. 85, p. 115.

Thiocol.—DR. JOHN MAIR, after reviewing the literature upon the use of tar and its derivatives in pulmonary phthisis, records his results after the use of potassium ortho-guaiacol-sulphonate in nine instances. This substance is free from taste and odor, and is readily soluble in water. About 70 per cent. is absorbed when two drachms daily are given. It is non-irritant and non-toxic, even causing no burning sensation in the mouth or throat. It relieves the anorexia, fever, emaciation, night-sweats, decline of strength, and vitality common in this disease more quickly and certainly than any other drug. It may be administered as a plain powder or given in tablet, capsule, or cachet, or disguised in orange syrup. It is rapidly excreted, the sulphur appearing as a sulphonade in the urine, and a small portion as guaiacol sulphonade. Since all the patients were treated in a poor neighborhood, with very unhygienic surroundings, and the improvement was marked, it is concluded that the remedy was a great benefit.—*The Therapist*, 1900, No. 4, p. 87.

OBSTETRICS.

UNDER THE CHARGE OF

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OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING
OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Ectopic Gestation.—At a recent meeting of the Obstetrical Society of London, DORAN (*British Medical Journal*, 1900, p. 1535) reported the case of a woman in her fifth pregnancy, who suffered from abdominal pain and diarrhœa. Labor came on, and was followed by septic symptoms. The outline of the fœtus could be plainly felt through the abdominal wall. As the case was found to be ectopic, the fœtus was removed by abdominal section sometime after its death. The sac was packed with gauze, and the placenta came away in fragments. A fecal fistula followed, and discharged a few weeks. For six weeks the patient felt well, when symptoms of chronic obstruction of the bowel with great emaciation set in, and she died. It was found that several coils of the small intestine had been dragged upon by traction of the sac. The adhesions involved several surfaces of mesentery which seemed to account for the emaciation. As the fœtus had developed in the posterior layer of the right broad ligament, there was no true sac inferiorly, and complete extirpation of the sac seemed hardly possible.

In discussion, Cullingworth suggested that irrigation of such a sac was not the best method of treatment. He feared by this means the carrying of septic matter to other structures. He believed that diarrhœa in this case was not only due to irritation of the intestine by the placenta, but also to septic absorption. Spontaneous closure of a fecal fistula may always be expected when the fistula is not tubercular or malignant. Malcolm had seen the patient before and during the operation, and drew attention to her extreme emaciation and debility. A putrid cavity and much sloughing of placental tissue had been the reason for washing out the sac so frequently. The symptoms preceding death were not those of obstruction of the bowels, although this condition actually existed. Boxall had twice seen a fecal fistula heal when the patient was in bad condition from a suppurating dermoid tumor. He suggested the use of a rubber bag which could be distended so as to make pressure upon the wall of the sac.

The Set of the Pelvis in the Body.—BARBOUR recently read a paper upon this subject before the Edinburgh Obstetrical Society (*British Medical Journal*, 1900, p. 1537). In antero-posterior curvature there is a marked inclination of the brim which affects the set of the pelvis in the body. He showed a drawing of a pelvis in a woman who had never walked, and its high promontory and almost vertical brim were very noticeable. We know that the direction of the brim varies greatly in different patients who may be

considered to be normal.   The position of the promontory can be described
by taking the distance which it stands back from the upper margin of the
symphysis and the distance above the symphysis.   The significance of the
position of the brim is in its influence upon the engagement of the head and
the expulsive force of the uterus.   It becomes more important in multiparæ
than in primiparæ.

It is also important to study the relation of the abdominal axis to the pel-
vic axis; this has not heretofore been done.   The inclination of the brim
should be described as a perpendicular let fall from the upper margin of the
symphysis on a line passing through the promontory in the long axis of the
abdomen.   The advantage of this method is that a fixed line within the
body is taken instead of an imaginary plane without the body.   The angle
of divergence of the plane of the brim from this perpendicular is necessarily
the same as an angle of divergence of the axis of the brim from the long axis
of the abdomen.   The smaller this angle the more does the long axis of the
abdomen come into line with the pelvic outlet.   The range of divergence in
pelves obstetrically normal is considerable, varying from forty to sixty
degrees.   While an average of fifty-five degrees may be taken, it is impor-
tant to know that pelves vary from this within certain limits.   To apply
these studies he would use a diagram including the lumbar portion of the
spine, representing it in the dorsal posture, and referring the inclination of
the brim to a perpendicular let fall in the long axis of the abdomen, which
is practically the horizontal plane passing through the pelvis.   The inclina-
tion of the brim should be marked not only by a line representing the mean,
but also by a maximum and minimum inclination for pelves obstetrically
normal.

Total Extirpation of the Ruptured Uterus Through the Vagina.—In the
Centralblatt für Gynäkologie, 1900, No. 26, IWANOW reports the case of a
patient in her first pregnancy who suffered from bronchitis.   The fœtus was
in transverse position, the arm prolapsed.   The patient was in charge of a
midwife, who vigorously massaged the abdomen when the pains, which were
strong, occurred.   Later the patient experienced sharp pains in the lower
portion of the abdomen, with hemorrhage and shock.   On the following
day she was admitted to the hospital.

On examination the entire cervix was found to be torn away, and the
under portion of the body of the child was lying upon the left side.   The
placenta was in the vagina, the fœtus in the abdomen, and the uterus had
contracted.   The child was extracted with difficulty by traction upon the
foot, and the uterus was removed through the vagina.   A mass of blood-clot
and meconium was found in Douglas' cul-de-sac.   A tampon of sterile gauze
was applied.   The patient made a gradual recovery complicated by sup-
puration in the pelvic tissue, which had been infected during labor.

Extraction of a Living Child After the Mother's Death.—KIRCH (*Cen-
tralblatt für Gynäkologie*, 1900, No. 25) reports the case of a patient who had
suffered from rheumatism and had mitral disease of the heart with failing
compensation.   On arriving at the house it was found that a child had been
born, while the mother was lying in collapse, with threatened death from

heart failure. Breathing and action of the heart had ceased. From the vulva protruded the foot of a second child, which was rapidly extracted and seemed dead. It was resuscitated and lived for a short time, finally perishing. It was learned upon questioning that the mother had been suddenly roused by a sensation of pain and smothering, after which the first child had been rapidly expelled, and that the delivery of the second child must have taken place nineteen minutes after the death of the mother. In spite of this delay the second child was resuscitated and lived for several hours.

Complete Rupture of the Uterus.—HALBAN (*Centralblatt für Gynäkologie*, 1900, p. 655) reports the case of a patient in her second labor whose pains suddenly ceased, and this was followed by hemorrhage from the uterus. A midwife examined the patient and found a prolapse of the umbilical cord. On examination the patient was found to be rhachitic, while the tissue, which was supposed to be the umbilical cord, was found to consist of the posterior lip of the cervix uteri, which had been almost torn from its attachment. A deep tear in the uterus was found penetrating the abdominal cavity.

Abdominal section was performed, and the child was found entirely outside the uterus within the abdominal cavity. The womb had been torn across its anterior wall as high as the position of a distended bladder. The uterus was completely removed with its appendages, and vaginal drainage was practised. The patient made an excellent recovery.

It is interesting to note that in this case rupture of the uterus occurred two hours after the bursting of the bag of waters. The posterior lip of the womb was cut and pressed against the promontory of the sacrum, partly tearing it away and thinning the abdominal wall above. The fœtus was for fourteen hours in the abdominal cavity, although it seemed to have occasioned no irritation of the peritoneum and no infection.

In discussion, Schauta drew attention to the very important fact that the fate of these patients is often decided by those who examine them before they are brought to a hospital. If they become infected they are usually lost. In discussion, attention was called to the good results obtained by abdominal section as compared with drainage through the vulva by gauze. A further trial of extirpation of the ruptured uterus by the vagina was also urged.

Syncytioma Malignum and Ectopic Gestation Causing Pernicious Nausea.—In the *American Journal of Obstetrics*, July, 1900, p. 1, DAVIS and HARRIS published a paper under the above title. The first case described was that of an ectopic gestation in the right tube in that portion of the tube passing through the uterine wall. Rupture had occurred, and bleeding was taking place into the abdominal cavity. Vaginal examination was negative, but severe symptoms of shock were present. Up to the time when rupture occurred it was impossible to diagnosticate pregnancy, although the patient suffered from severe and persistent nausea. Pregnancy was denied by the patient, and no physical sign was present. The patient was operated upon and made an uninterrupted recovery.

The second case was that of a multipara whose labors had been spontaneous. She had missed her menstruation for nearly two months, and had

pernicious nausea. She was of robust physique and had previously been very strong. She was transferred to hospital and the uterus emptied under ether. The nausea ceased, but the patient did not regain strength, had paroxysmal attacks of vomiting, became almost maniacal, and passed feces and urine involuntarily. Her one prominent symptom was severe headache not localized. Her pupils were unaltered, and there seemed to be no interference with the function of the cranial nerves. She died of exhaustion.

Upon autopsy syncytial tumors were found in the brain, the lungs, the kidneys, and the liver. The uterus and pelvic organs were normal. Microscopical study showed the tumors to be typical and afforded abundant opportunity for studying the development of this interesting growth.

[This case is remarkable for the absence of pathological conditions in the uterus. It resembles the case recorded by Schmorl in which the womb was normal, but syncytial tumors were present in the kidneys, lungs, liver, and intestine of a woman who had died as the result of the general involvement of the viscera by the new growths. The gross appearance of the tumors was essentially that of sarcomata, but microscopical examination made the diagnosis certain. —ED.]

GYNECOLOGY.

UNDER THE CHARGE OF

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Formol in the Treatment of Uterine Hemorrhage.—GERSTENBERG (*Centralblatt für Gynäkologie*, 1900, No. 34) reports a series of cases treated with intra-uterine applications of a 40 per cent. solution of formaldehyde. He recommends this treatment especially in cases of climacteric hemorrhage and in those of unknown origin.

In hemorrhage after abortion, where curettement is not practicable, good results were obtained after three applications. When disease of the adnexa is the etiological factor this treatment can only be expected to effect a symptomatic cure.

No bad result followed the applications. The technique is simple. The solution is applied on cotton wrapped around an applicator, strict aseptic precautions being observed. Patients should be kept in bed for a couple of days if possible.

Operations on the Large Intestine by the Vaginal Route.—LIERMANN (*Beiträge zur klin. Chirurgie*, Band xxv., Heft 1) describes the following method practised by Rehn : After tamponing the rectum the posterior vaginal wall is incised from the portio to the fourchette, and the flaps are dissected off, if necessary, as far as the ischiorectal fossa and tubera ischii. The rectum is then separated down to the sphincter, the muscle being spared if possible. The diseased portion is removed and the upper end is brought

down and sutured to the anal ring. When Douglas' pouch is opened the peritoneal wound is usually closed, although the progress of the case is equally satisfactory if it is left open. The bowels are moved on the third or fourth day. In the cases observed there was no more reaction than after an ordinary vaginal section.

The writer states that by this method it was found to be possible to resect a portion of the colon and to fix the distal end in the anal ring. It is recommended in cases of neoplasms, prolapse of the gut, and strictures situated high up.

Carbide of Calcium in Cancer of the Uterus.—GROUZDEY (*La Gynécologie*, 1900, No. 4) adds his testimony as to the value of this preparation in cases of incurable carcinoma. He applies it to the diseased area in gauze bags, protecting the vagina with tampons. He finds that healthy granulations are formed, the foul discharges and hemorrhages are arrested, while pain is relieved and the general condition is much improved.

The good effects persist for a week, when a fresh application should be made. He has observed no ill results, but adds the caution that the surface of the vagina should be thoroughly dried before the carbide is introduced.

The writer has also obtained good results in treating in a similar manner benign erosion and ulcerations of the portio vaginalis.

Œdema of the Bladder in Stricture of the Urethra.—KOLISCHER (*Centralblatt für Gynäkologie*, 1900, No. 17) calls attention to changes in the vesical mucosa in cases of congenital stricture of the female urethra. These strictures appear through the endoscope as whitish, shining projections, more or less circular. The mucosa at the urethral orifice is œdematous, the œdema involving the vesical mucous membrane over a considerable area. Actual loss of substance may result, so that small ulcers are formed with elevated borders. The symptoms caused by this condition are frequent and painful micturition and tenesmus, while the urine often contains pus and blood.

All treatment is useless until the stricture has been divided, after which applications of iodoform are recommended.

Prolapse of the Urethral Mucous Membrane.—VOILLEMIN (*Thèse de Paris;* abstract in *La Gynécologie*, 1900, No. 4) attributes this condition to unusual laxity of the submucous layer of cellular tissue. Prolapse is most often observed in very young girls and in women after the climacteric, seldom in women during active sexual life. Among the common causes are dilatation of the urethra, senile involution, and violent straining (from constipation, cough, etc.), though urethritis and traumatism are occasional etiological factors. The early symptoms—painful and difficult micturition—are succeeded by constant pain, dyspareunia, and inability to take any exercise, hemorrhage, and even complete obstruction to the flow of urine. As the prolapse becomes more marked, ulceration occurs, and the bleeding may be profuse.

Excision with the galvano-caustic wire is recommended, or, better, removal of the prolapsed portion and suture of the edges.

Total Extirpation of the Uterus for Complete Procidentia.—FRONIP (*Münchener med. Wochenschrift*, 1900, No. 10) reports six cases operated upon by Martin's method. Five patients were examined at various intervals after operation. Although they had performed severe manual labor, no instance of recurrence of the cystocele and rectocele was observed.

The writer refers to Freund's method of retroverting the uterus through an opening in the posterior vaginal fornix and suturing it to the anterior vaginal wall, but thinks that it is only applicable to cases in which the organ is large. When it is atrophied or diseased total extirpation is preferable.

Ultimate Results of Abdominal Myomectomy.—BURCKHARD (*Zeitschrift für Geb. u. Gynäkologie*, Band xliii., Heft 1) summarizes his views on this subject as follows: Unless removal of the cervix is indicated by actual disease or the necessity of drainage there need be no fear of retaining it because of the liability to subsequent malignant degeneration. With few exceptions the ultimate result of hysterectomy for fibroids is good; such reflex disturbances as follow the operation are seldom profound. After castration hemorrhages may be expected to cease, provided that every trace of ovarian tissue has been removed, and in most cases the tumor diminishes in size. Menstrual molimina seldom persist after the removal of both ovaries, but are more common when one or both ovaries are removed, whether the uterus is left or not. Increased nervous irritability is not common, especially if the ovaries have been preserved. Grave psychological disturbances were never observed by the author. He concludes that it is always better to preserve the adnexæ if they are healthy.

Physiological Relations Between the Uterus and Adnexa.—ROUBIN-STEIN (abstract of thesis in *La Gynécologie*, February 15, 1900) conducted a series of experiments in rabbits and dogs with a view to determining the effect upon the uterus of removal of the ovaries alone, the tubes being preserved. It was found in the majority of cases that removal of one ovary was followed by marked compensatory hypertrophy of the remaining one. Microscopically a decided increase in the number of Graafian follicles and corpora lutea was observed. No anatomical changes in the uterus resulted from extirpation of one ovary, but after removal of both the endometrium invariably became atrophied, including the surface epithelium and glands, and general proliferation of the connective tissue and atrophy of the muscular fibres occurred. When transplanted or left free within the peritoneal cavity the ovaries sometimes atrophied, sometimes preserved their functional activity, the uterus maintaining its normal anatomical structure, or the reverse, according to the condition of the ovaries.

The writer concluded that removal of the uterus alone was not followed by any anatomical or physiological changes in the ovaries, while the tubes were also not affected.

Resection of the normal ovaries was followed by complete restoration of tissues and glandular elements, without the formation of true cicatricial tissue, while no alterations were noted in the uterus and tubes.

[It should be borne in mind that the conditions present in aseptic operations upon healthy animals are essentially different from those encountered by the abdominal surgeon. It is one thing to resect normal non-adherent ovaries, and another to excise macroscopically diseased portions of these organs after separating adhesions which naturally tend to re-form. Hence the prognosis as to subsequent atrophy of the ovaries after conservative operations must always be doubtful.—H. C. C.]

Results of Implantation of the Uterus in Treatment of Fistulæ and Procidentia.—FREUND (*La Gynécologie*, February 15, 1900) reports the remote results of operations for the repair of complicated genital fistulæ and procidentia, in which the uterus was retroverted into the vagina and the cervix sutured in the wound. In young women menstruation appeared for a few times and then ceased entirely, the uterus undergoing atrophy. No incontinence of urine or feces was noted. The patients were permanently cured, so that they could perform the most severe labor. Coitus became impossible except in one instance. The indications for the operation, as stated by the author, are : 1. Extensive loss of tissue, complicating vaginal fistulæ. 2. Complete procidentia, of unusual degree, in women after the climacteric. In any case it is assumed that the uterus must have lost its functional activity.

Subcutaneous Injection of Iron in Amenorrhœa.—HENROTAY (*La Gynécologie*, February 15, 1899) recommends hypodermoclysis in cases of amenorrhœa in young girls due to anæmia. He introduces from eight to ten ounces of a solution of the pyrophosphate of iron (fifteen grains to the pint) beneath the breast. If the injection is too painful the glycero-phosphate may be substituted.

Two cases are reported, in one of which the menses returned after the fourth injection and continued regularly after eight had been given. The other patient, who had taken large quantities of iron without results, menstruated normally after she had been treated for eight days. The writer was unable to explain whether the prompt result was due to the fluid alone or to the iron. It was noted that soon after each injection a general feeling of prostration was felt, which persisted until the following day.

Chronic Rheumatism from a Gynecological Stand-point. — STEINBÜCHEL (*Ibid.*) analyzes 1000 cases with a view to the differential diagnosis between rheumatic pain and those due to pelvic affections. He finds in women of all ages nodules of different sizes most frequently in the ileosacral region, accompanied by pains which closely simulate those due to pelvic inflammatory conditions.

These nodules, which are characteristic of rheumatism, are due not only to contractions and serous infiltrations of the muscles, but they may develop primarily in the fascia, muscle-sheaths, and attachments of tendons, and by the resulting pressure may cause an irritable state of the muscle.

The prognosis with expectant treatment is unfavorable, but a cure can nearly always be effected by massage, baths, and active and passive movements.

OTOLOGY.

UNDER THE CHARGE OF

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Otitis Media in all Grave Diseases of Infancy.—E. H. POMEROY (*Boston Medical and Surgical Journal*, January 18, 1900) has written a most important article with the above title. He says at the outset: "My idea is that most of the diseases of infancy are more positively, more comprehensively, more demonstrably infectious from definite bacterial infection than we can easily prove in adults, or if toxæmia from bacterial growth, also more definite; and that the pharyngeal post-nasal chamber is the more easily comprehensible distributing point for infection to the middle ear, the brain, the lung, the stomach, the intestines; and the middle ear as incubator and generator promoting general toxic disturbance in very many cases of localized infectious diseases."

He has been impressed by Ponfick's tables (*Berliner klinische Wochenschrift*, September and October, 1897) " of 100 consecutive autopsies of infants under three years of age, with special reference to the conditions of the ears therein." These autopsies were divided into two groups, viz., non-infectious and infectious processes. In most of these cases the condition of the middle ear or ears preceding death was not suspected. In the non-infectious group were found two of congenital heart disease, one of extensive burns, and three of non-infectious dermatitis. Of these only one was found free from otitis. This was an infant of five and a half months with congenital heart disease. "Although this disease would appear to have the least possible connection with otitis, yet the only other case of congenital heart disease in this group was a one-year-old child showing otitis media in both ears," both drum cavities being filled with pus.

The second group, that of infectious processes, embraces 94 per cent. of all cases collected. This is subdivided into two classes: (*a*) acute and (*b*) chronic. Under sub-group *a* we are informed that in four cases of infectious dermatitis —*i. e.*, furuncles and erysipelas—not one was free from purulent otitis media. In a second group are six cases of diphtheria, with three free from otitis media. Naturally, we might expect more aural lesions in this group, but the comparative freedom from ear suppurations in this group is due to the fact that "the local inflammation (in diphtheria) is so early and so intense near the pharyngeal end of the Eustachian tube that the Eustachian orifice is closed in many cases before the germs gain entrance into the tympanic cavity."

[We have long maintained that a beneficent closure of the pharyngeal mouth of the Eustachian tube takes place in all instances in which the nasopharynx is loaded with pathogenic germs. It is unfortunate when this seal is broken, either by the efforts of the patient or his physician, to inflate the tympana and thereby launch disease germs into a naturally aseptic cavity.]

In group 3 the one case of scarlatina showed otitis media on both sides.

In group 4, in eleven cases of uncomplicated pneumonia, there was only one —a six-months-old child—in which otitis was absent. In the other ten, varying from two to fifteen months, all showed ambilateral purulent otitis media. In groups 6 and 7 are cases of a complication of pulmonic and enteric diseases. In these two groups were 35 per cent. of all cases tabulated by Ponfick. Of chronic enteritis, complicated or not with pneumonia or severe respiratory disease, there were twenty-six cases, only one of which was free from otitis media. In three cases of congenital syphilis, all under four months, the cause of death was thought to be " a low constitutional vitality without any special symptomatology beyond this ; but post-mortem examination revealed in all three of these cases purulent otitis media upon both sides." Pomeroy says : " In the face of these facts it seems to me we cannot conscientiously attend any grave disease in children without the most careful examination as to the condition of the ear." He then gives notes of five cases with symptoms of gastro-enteritis and pneumonic complications, in one of which otitis media was found to be the true cause of the severe general symptoms. The first case proved fatal, the ear not having been suspected as the cause of disease ; the other four recovered promptly after paracentesis of the membrana tympani. He concludes by saying that the policy of waiting for ear symptoms to arise in infants is entirely unreliable, because in Ponfick's 100 fatal cases spontaneous rupture had occurred in less than 9 per cent. of the series.

Osteoma of the Auditory Canal.—KAYSER (*German Otological Society*, May, 1899; *Archives of Otology*, October–December, 1899) has exhibited a large bony tumor, 17 mm. by 11 mm., removed from the posterior superior wall of the external auditory canal. The patient, a man forty years old, had suffered from transient otorrhœa in youth. The tumor had a pedicellate attachment, and was easily removed by a few blows of the chisel. The tumor was cancerous in structure. After its removal the perforation in the membrana closed, the otorrhœa ceased, and the hearing was much improved.

Tubercular Tumors of the Skull and Both Tympanic Membranes.—H. FREYSING (*Archives of Otology*, October–December, 1899) reports the occurrence of multiple tubercular tumors of the skull and both membranes, pursuing a relatively mild course, in a young man of nineteen years. The growths were removed by means of the knife, and the wounds healed rapidly and well. After six months there was no recurrence, and the patient's general condition was good. There were no signs of tubercular disease elsewhere in the body.

The Ear in Typhoid Fever.—F. SIEBENMANN (German Otological Society, May, 1899, and *Archives of Otology*, October–December, 1899) has found in autopsies of three cases of typhoid fever the fossula of the round window filled with fatty tissue. The genesis of these lipomatous masses at this point is not yet determined.

Otitis Media in Early Childhood.—A. BARTH (*Archives of Otology*, October–December, 1899) draws attention to the fact that in young children the

ear is often affected at the same time that other diseases are present, and
that there may be a causal relation between the two conditions.   He is im-
pressed with the fact that recent records show that of 600 children examined
before and after death 80 per cent. were found to have a lesion of the middle
ear.   He states that though the middle ear may be inflamed and contain pus,
the membrana often shows little or no alteration excepting a bulging at some
point ; it may or may not be infected.   He believes that infection of the ear
takes place from the nasopharynx through the Eustachian tube—e. g., by
water forced into this space in breathing and in the use of the nasal douche.
He also maintains that spontaneous rupture of the membrana is the rule in
otitis in adults, while in young children it is the exception.   (This is prob-
ably due to the fact that in very young children the membrana is much
thicker than in older ones.)

"The influence exerted upon the general system in cases of otitis media
is greater in children than in the adult.   Many children often lose their
appetite and have other digestive disturbances which, if the trouble lasts
long enough, end in general marasmus and death.   Symptoms of some
other trouble to which the ear affection may be secondary often mask the
symptoms of the middle-ear inflammation entirely ; again, the middle-ear
trouble may run its course without affecting the general condition of the
child."   (The latter may be true of recognized ear disease characterized by
a discharge—i. e., by an external symptom—but the unrecognized, the unsus-
pected ear disease, is often the cause, not the effect, of loss of appetite, diges-
tive disease, marasmus, and death.)   Barth concludes by saying, "From what
has been said of the frequency of middle-ear inflammations in children and
of the *absence of symptoms* in many instances, we can conceive of the *rationale*
of a daily examination of the ears of all unwell infants from the beginning
of their trouble to the end of convalescence.   In the absence of otorrhœa
there is no symptom by which inflammation of the middle ear can be recog-
nized with any degree of certainty by the inexpert, so that the children are
often treated for other infantile diseases when *an inspection* of the drum might
have led to a diagnosis."

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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On the Position of the Malignant Adenoma among Tumors.—HANSE-
MANN (*Virchow's Archiv*, 1900, vol. clxi., p. 453) objects to the view recently
expressed by Selberg, that the malignant adenoma is a special form of tumor,
and advances the following line of argument in support of his objections :

Clinically the course of the malignant adenoma is exactly like that of the
carcinoma.   It can recur after extirpation ; it can ulcerate.   Left to itself it

has no physiological limit of growth, and it causes an increasing cachexia up to the time of death. The relation of this tumor to the carcinoma can be followed best in the adenomata of the colon, owing to the marked differentiation of the normal epithelium into beaker cells. In some destructive adenomata of the colon, beaker cells may occur in all parts of the growth. If metastases have occurred, beaker cells may or may not be present in them. If the tumor returns after extirpation, beaker cells may be present or absent. Such adenomata containing beaker cells show the least conceivable histological variation from the normal mucous membrane. But there are other malignant adenomata of the colon which from the beginning contain no beaker cells, and in which theá never occur in the metastases or in the recurrences.

For a tumor to deserve the definition of the malignant adenoma, authors desire that the gland character shall be preserved, not only in the primary tumor but also in the recurrences and in the metastases. Such cases actually occur, but more often there occurs in the metastases and recurrences a gradual transformation to cylindrical cell carcinoma, or even to medullary or colloid carcinoma. The writer cites such a case. To this transformation or development in the character of the growth he applies the term " anaplasia," and he says that the possibility that the anaplasia in such a tumor may increase exists at all times in every malignant adenoma.

Although these relations between adenomata and carcinomata are less evident in other organs in which the cells are less differentiated, still they can be observed everywhere. There are malignant adenomata of such slight anaplasia that it is shown not in the form of their cells, but only in their course and in their manner of spreading. From these forms there are all possible transitions to the most anaplastic carcinomata; this variation is shown not only by comparison of different tumors with each other, but can be seen in different parts of the same tumor or in its recurrences and metastases.

Because occasionally tumors are found which retain the adenomatous structure in the primary tumor and in the metastases and recurrences, it must not be concluded that they must retain it under all circumstances. That would be the peculiarity of a special form of tumor, just as a carcinoma always remains a carcinoma and never becomes a sarcoma, or a lymphosarcoma never changes to a spindle-cell sarcoma; but a malignant adenoma can change at any time and in any place to a carcinoma, or, as the author expresses it, " increase in anaplasia."

To state the thought briefly, the destructive adenoma differs from the carcinoma not in principle, but in degree.

It is convenient to retain the names malignant adenoma, adenocarcinoma, etc., because they express more than the term carcinoma.

Hansemann's conclusion is that malignant adenomata distinguish themselves in no way from carcinomata, and do not deserve to be elevated to the position of an especial form of tumor. They are not co-ordinate with carcinomata, but subordinate.

Beside this discussion of the relation between malignant adenoma and carcinoma, the writer also treats at some length of the different varieties of the malignant adenoma and of the situations in which it is found.

A Modification of van Ermengem's Method of Staining Flagella.— HINTERBERGER (*Centralblatt für Bakteriologie*, 1900, xxvii., 597).

The object of the author's modification is to avoid the precipitate which is almost always present in the van Ermengem specimens. He thinks it due to an excess of silver nitrate. To get rid of this he bases his procedure on the fact that silver nitrate treated with sodium chloride is precipitated, and this precipitate dissolves in ammonia or the subsulphate of soda. He uses an alcoholic solution of silver nitrate for staining, because only the excess is precipitated by the sodium chloride.

The writer strongly advises against metal forceps, and describes a pair which he has devised made of glass. He also emphasizes the necessity of extreme cleanliness of the cover-slips.

For cleaning the latter he recommends boiling in chromic acid solution, pouring off and changing the solution repeatedly till it no longer changes color ; the cover-slips are then washed repeatedly with water, followed by 95 per cent. alcohol, and alcohol and ether, and are then allowed to stand in absolute alcohol till needed. When ready for use handle with sterile forceps and dry over a Bunsen flame. Place a drop of boiled filtered well-water on a clean cover-slip and make an emulsion of the culture, and from this prepare the specimens for staining. Dry in air. Fix in a thermostat at 100° to 110° C. for a few minutes. Drop on van Ermengem's mordant for thirty minutes. Wash alternately in water and 95 per cent. alcohol, removing the latter finally with distilled water. Drop on a 1 per cent. solution of the crystals of silver nitrate in absolute alcohol. Let this flow off, and in a few minutes dip alternately several times into a 7 per cent. sodium chloride solution and a 30 per cent. solution of ammonia.

Remove excess of ammonia with 95 per cent. alcohol, and wash with water. Drop on a solution of gallic acid (distilled water, 20 parts ; 3 per cent. gallic acid, 20 parts ; 50 per cent. sodium acetate, 2 parts) ; draw off with filter paper (do not blot). Pass it rapidly through a bath of 0.25 per cent. silver nitrate solution in equal parts of water and 95 per cent. alcohol till solution begins to turn black and the preparation a faint brown. Dry and mount in balsam.

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ERRATA. DR. C. W. BURR's article in JOURNAL for March, 1901.
Page 305, line 22, *for* "stereoagnosis," *read* "stereognosis."
" 305, " 24, " "stereoagnostic," " "stereognostic."
" 305, " 27, " "stereoagnosis," " "stereognosis."
" 309, " 5, " "stereoagnosis," " "stereognosis."
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PRIMARY SPLENOMEGALY.

WITH A REPORT OF THREE CASES OCCURRING IN ONE FAMILY.[1]

By N. E. Brill, A.M., M.D.,

of new york.

THE cases which are about to be reported here are, in addition
to their extreme rarity, noteworthy because their subjects have been
under my observation for over fifteen years. I have refrained from
publishing them earlier, since no scientific results could be obtained
from a mere description of their clinical histories. I had long con-
sidered them unique and knew of no other cases in the literature just
like them. They are now recorded so as to supplement the valuable
contribution to *splenomegalia primitiva* made by David Bovaird, Jr.,
in a recent number of THE AMERICAN JOURNAL OF THE MEDICAL
SCIENCES (October, 1900), in which he describes two similar cases.

These cases reveal a family form of primary splenomegaly all devel-
oped in one generation. On this account the *family history* of these
patients is important.

The mother of my patients is in her sixty-second year, in perfect
health. The father died last year, under my care, of pneumonia. Of
the maternal parents (the grandparents of the patients), the father died
at seventy-two years, likewise of pneumonia, under my observation;
the mother at thirty-eight years, in childbirth. Of the paternal
parents, the father is said to have died of gallstones at seventy-three
years; the mother died last year, at ninety-four years, of shock due to
a fall down stairs, while under my care. In none of them who were
under my observation was there any enlargement of the spleen or liver.

As far as inquiry as to the great-grandparents of our patients goes,
an accurate report can be furnished only as to those on the maternal

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[1] Two of the patients were presented at the meeting of the Society of Alumni of Bellevue
Hospital, November 7, 1900.

side. The great-grandfather died of an apoplexy at eighty-five years, the great-grandmother of an acute disease of one week's duration. On the paternal side the great-grandparents died, it is said, of old age.

The mother of my patients gave birth to six children. Of these the eldest is in perfect health and is the mother of two healthy children. The second child died at the age of three years, of chronic diarrhœa and marasmus. The third is one of the cases here reported. The fourth is in good health. The fifth is the second of the cases here described. The sixth died at the age of nine years, of an enlargement of the spleen, and furnishes the third case of this disease.

I had not the fortune to see the last child, whose death occurred before my introduction professionally into the family. Trustworthy accounts tell of the life of this boy, which was one of suffering after the third year from birth. The child was slow and lacked energy, but was not at all mentally backward. The mother noticed its inability to run and play like other children of its age. She likewise noticed an increasing fulness of its abdomen, with a commensurate increasing languor and indisposition to make any effort. According to her statement, the nature of the disease was unknown to the physician first consulted. Toward the end of his short life all the physicians agreed that there was an enormous enlargement of the spleen. The abdomen enlarged greatly ; the child became weaker, its skin became yellow and shrivelled, and finally the child could no longer walk, and died of asthenia.[1]

Dora W., the third child, is thirty-four years old, married ; has had no children and no miscarriages. She has been under my observation since 1885. I am told she had none of the ordinary diseases of childhood. She had always been healthy, energetic, and almost tireless in her social duties. She was married in 1888. She never had malaria, rheumatism, tuberculosis, or rachitis.

Before her marriage I had no occasion to make a physical examination of her. She did not note anything unusual about her condition until about this time, but was convinced shortly after her marriage that there was an enlargement of the abdomen under the ribs on the left side, where there was a firm mass, which occasioned no discomfort whatever.

On examination I found a spleen which extended from the lower border of the eighth rib above to three finger-breadths below the costal margin and almost to the parasternal line. The liver was not enlarged. There were no enlarged lymphatic glands. All the thoracic organs were normal.

A relative estimation of the proportion of white to red cells of the blood was made according to the methods then in vogue, when but few blood-counts were made in America, and revealed what I believed to be more white cells in the field than was normal. The diagnosis of leukæmia was made and subsequently corroborated by a prominent consultant. Both of us gave a bad prognosis.

After treating the patient for about two years, and there being no reduction in the size of the enlarged organ, the patient sought other advice and treatment. While under my care she was treated with

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[1] Since writing this I have had a communication from the physician under whose care the child had died, Dr. L. Schöney, who corroborates these data and says that no examination of the blood had ever been made in the case.

iron, quinine, and arsenic. I did not see the patient again professionally until 1895, when she gave me an opportunity to examine her again. During this period the spleen had increased considerably ; its anterior border extended further forward toward the mesial line. A notch was distinctly felt midway between the umbilicus and the lower border of the ribs. The limit of growth forward was in the mesial line midway between the umbilicus and the pubes.

She informed me that while under the care of a colleague she had been treated with continued large doses of quinine and arsenic, also with methylene-blue, with injections into the spleen of pyoktanin, ergotin, and arsenic, with cataphoresis with these drugs, with electrolytic puncture of the spleen, and with galvanism over the organ.

Between these years she had two attacks of pleurisy, with effusion of a clear, yellow serum. She also developed a tendency to sweating, with sudamina, which culminated in the summer of 1895 in a most severe attack, which persists on varying occasions to this day. In 1896 the sudamina assumed a tendency to be hemorrhagic and finally changed to what the patient called a " crop of blood-boils." Up to this time there had been no indications of any hemorrhagic tendencies. She had normal menstrual periods of normal amounts.

The first systematic blood examination was made by me in 1895, with the following result : Red cells, 4,800,000 ; white cells, 7168 ; hæmoglobin, 80 per cent. (Gowers' instrument).[1]

In 1896 I treated the patient for an attack of typhoid fever, which went through an ordinary course without complications ; the attack lasted six weeks. It is worthy of note that during her typhoid the spleen, which had been previously hard and tense, was much softened, but no larger than it had been one month before (July, 1896) when I had examined it. After this, however, marked changes in the physical condition occurred, and a detailed description is important to show the steady progress in the disease and the development of new symptoms.

Status of the Patient Two Months after the Typhoid Convalescence (*December* 14, 1896). The patient is a small woman of small osseous development. The skin has now a peculiar yellowish hue (not like icterus), with a tendency to shrivel like the skin of an old woman. It is marked by dark pigmented spots sparsely scattered over the trunk and extremities, most numerous on the anterior surface of the right leg. These are the residua of a crop of hemorrhagic furuncles. There are no glandular enlargements to be felt anywhere. The tonsils are rudimentary. The gums are a little spongy and inclined to bleed. There is no marked pallor to the visible mucous membranes. Over the sclerotic of each eye is a wedge-shaped patch, yellow in color (the rest of the sclera is white), which extends from the corneal margin, where its base is 3 mm. broad, toward the canthus of each eye for a distance of 0.5 cm. These do not look like pinguecula.

The shape of the trunk is peculiar, the lower part of the thorax and upper part of the abdomen being enlarged in all directions, the greatest

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[1] It is my opinion that Gowers' hæmoglobinometer is over-standardized, and that the hæmoglobin of these patients' blood is higher than the figures given. The writer has found that the hæmoglobin percentage of blood in healthy people with high color often falls below the 100 mark of this instrument.

circumference being at the level of the umbilicus. This region is distinctly round, the antero-posterior diameter being fully as large as the lateral.

Respirations, 28; pulse, 80.

Lungs. At both bases there are diminished breathing and diminished voice-sounds, due to pressure upward of the spleen and liver.

Heart. Apex-beat at the lower border of the fourth rib, one inch to right of nipple. Upper border of cardiac dulness at the upper border of the third rib, right border at midsternal line. There are no cardiac murmurs.

Liver. Somewhat enlarged. The upper border is just below the fourth rib; lower border 3 cm. below the free costal margin, in the mammillary line. The entire region is tender to pressure.

Spleen. The anterior border is round, sharply demarcated, and presents a large indentation, the notch 2 cm. to the left of the middle line and 2 cm. above the umbilicus. It extends downward over the bladder to 4 cm. above the right pubic spine, where it curves, to be continued with the posterior border, which emerges into the abdomen at about the crest of the ilium. The spleen is very tense and firm; its surface has no irregularities or nodules and is uniformly smooth. The upper border of splenic dulness is over the seventh rib, in the axillary line.

The veins of the skin of the abdomen are not very prominent. The lower abdomen protrudes.

The uterus is crowded downward and backward.

The urine is acid, 1012 specific gravity, and contains no albumin, no casts, no bile, and no sugar.

The blood-count shows red cells, 3,800,000; white cells, 6400; hæmoglobin, 65 per cent. (Gowers).

This examination of the blood shows a reduction in the number of red cells as well as the hæmoglobin from the previous one. The slight simple anæmia manifests itself in the pallor of the skin.

A qualitative count of the white blood-cells showed multinuclears, 65 per cent.; large mononuclears, 5 per cent.; small mononuclears, 30 per cent. There were extremely few eosinophile cells.

There was no poikilocytosis nor were there any nucleated red cells.

A thorough course of mercurial inunctions and internal administration of sodium iodide was instituted, but with no effect on the splenic enlargement.

After this the spleen grew gradually and quickly in size in all directions, and the liver but slightly. The detailed descriptions of the conditions found in my various examinations during the next three years are unnecessary and would be tiresome to the reader. It is important to state, however, that the blood showed at no time any marked qualitative change from the normal limits of red and white, there being a slight tendency to leukopenia, the highest number of white cells being 6144, the lowest 4200. The hæmoglobin remained about 75 per cent., the variations being from 65 to 80 per cent. (Gowers). At no time was there any qualitative change present in the red or white cells indicative of any serious form of anæmia.

During these years the patient suffered occasionally with dyspnœa, pain in the right ankle and leg. There was no tenderness over any of the bones at any time. She also was troubled with numbness in the

finger-tips, though examination revealed no objective disturbances of sensation to pain, touch, or temperature.

The notes of my last examination bear the date of October 4, 1900. The abdomen is more protuberant; the upper border of the splenic dulness is on the fifth rib. The posterior border of the spleen can be distinctly felt on palpation. It extends along the vertebral column from the last rib above to the crest of the ilium below. In front it extends into the pelvis, and its anterior border in the lower third extends across the abdomen, there being but 0.5 cm. between it and the right superior spinous process of the ilium. The lowest part of the spleen fills the pelvic cavity.

Fig. 1.   Fig. 2.
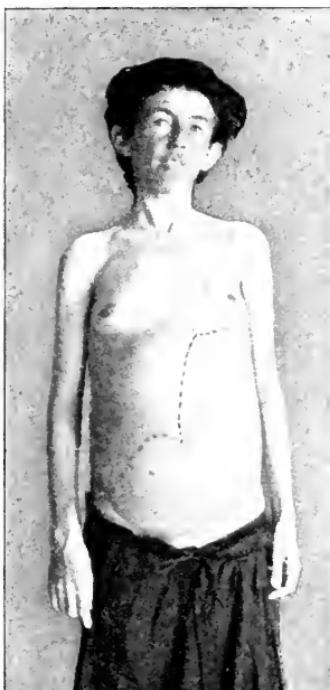
The cross to the right of the nipple shows the position of the apex of the heart; the dotted lines indicate the upper and anterior limits of the spleen.

The liver is crowded somewhat upward, the upper border of dulness being in the third interspace, the lower border 6 cm. below the costal margin, in the mammillary line.

The circumference of the abdomen has increased markedly. There is tenderness over both spleen and liver. The general features are much better shown in the accompanying photographs than by any description. (See Figs. 1 and 2.)

The color of the skin of the patient is a peculiar brownish-yellow, nothing like an icteric skin, however; her mucous membranes are pale, yet her blood shows 4,200,000 red cells, 7168 white cells, and the hæmoglobin is 70 per cent. The differential count of the leucocytes

is: Polynuclear, 56 per cent.; large mononuclear, 8 per cent.; small mononuclear, 35 per cent.; eosinophile, 0.75 per cent.

The patient states that she feels very well, better than at any period since 1895, yet emaciation is growing pronounced.

The apex-beat is in the third interspace, 3 cm. to the right of the left nipple, and the upper border of cardiac dulness is at the upper border of the second rib.

The abdominal and thoracic superficial veins of the skin are more prominent.

During the past year there has been at infrequent occasions a tendency to bleed from the gums, the blood oozing from the surface, which is somewhat spongy. There have been no hemorrhages from any of the other mucous surfaces or from the kidneys.

At no time was the plasmodium malariæ ever present in her blood, which was frequently examined, nor were there ever any nucleated red cells or a poikilocytosis. The largest number of red cells was 4,800,000, the smallest 3,800,000; the highest hæmoglobin percentage was 80, the lowest 65. Considering that the patient is a woman, the hæmoglobin percentage is not much less than normal, though recently a tendency to an anæmia of the chlorotic type is manifest.

There has never been any œdema of the feet or legs, nor of the skin anywhere, and no ascites.

The body temperature has always been normal and never was higher than 99° for the evening temperature.

Maximilian R., the third patient, is thirty years old. He is married and has a healthy boy, aged one year. He has been under my observation since 1885. He had most of the infectious diseases of childhood at various times up to his ninth year, including measles, whooping-cough, chicken-pox, and scarlet fever. He was not robust until after his ninth year, when he gradually developed into a sturdy boy. He is in the tobacco business and never missed a day from business on account of illness until the past summer. He has never had malaria, rheumatism, gonorrhœa, syphilis, rachitis, or tuberculosis.

Up to 1889 there was no splenic enlargement; he had been examined frequently by me during these years in the course of a number of attacks of bronchitis.

After learning that his sister had an enlarged spleen, and knowing that his youngest brother had died about seven years before with a similar disease, he came to me in March, 1889, for an examination. The result was as follows:

The patient was a well-nourished, thick-set young man, with good color, short in stature, and muscular. His general appearance indicated health. Across his nose and on either side of the cheek was an erythematous patch, with a few red papules. His skin was moist and covered with sudamina. He says he perspires very freely at all times. Pulse was 76 and strong; respirations, 20. He had no complaints of any kind and asked for an examination to determine whether he had, as he called it, a spleen, meaning an enlarged spleen. The thoracic organs were perfectly normal.

On palpating his abdomen the edge of the spleen could be felt, on deep inspiration, with the fingers well under the costal arch; percussion, however, showed dulness in the post-axillary line at the lower border of the seventh rib, which I took to be the upper border of the

spleen. The spleen was evidently enlarged upward. There was no increase in the relative proportion of white to red blood-cells.

The patient was immediately put on arsenic, which apparently produced a diminution in the size of the spleen, for my notes of April, 1890, show that the upper border of splenic dulness was in the eighth interspace, in the post-axillary line. In July, 1890, he consulted me about frequent epistaxis, occurring every few days, and about the erythema on his nose and face. The upper border of splenic dulness on this occasion was on the ninth rib; a still further reduction in the size of the organ. No blood examination was made on this occasion.

He was informed of the necessity of keeping up with his Fowler's solution and reporting to me occasionally. After this I saw the patient very seldom, as he felt in perfect health and entered upon an active business career. He visited me about twice yearly.

In August, 1893, he came again to me, complaining once more of frequent epistaxis, and with a still more vivid erythema of the nose and face. He had in the meantime consulted numerous dermatologists about the inflammation of the skin over his nose and cheeks, but without benefit. On this occasion he had an attack of nose-bleed in my office, and I found on rhinoscopic examination a general surface oozing from the nasal mucous membranes. This was controlled by packing with styptic cotton. On examining his abdomen I discovered the splenic edge to be distinctly palpable a trifle below the free border of the ribs. The upper border of splenic dulness was again over the lower border of the seventh rib, as it was in March, 1889. He told me he had been careless about taking his arsenic, which he had not taken at all for a long time.

A blood-count on this date showed red cells, 5,400,000; white, 7168; hæmoglobin, 90 per cent. (Gowers). No plasmodium malariæ was present in three successive examinations made during the week.

The urine was light yellow; specific gravity, 1014; acid; no albumin, no casts, no sugar; urea, three grains to the ounce; sediment of triple phosphates and urates. There was still profuse perspiration and sudamina covered the skin.

From this time on the patient consulted me frequently and took his arsenic conscientiously, yet there was no diminution in the size of the spleen, nor was there any increase. As with his sister, a systematic course of mercurial inunctions and the administration of large doses of iodides were given, but with no effect on the organ.

During this period and for the next four years he considered his health to be perfect, his only complaints being an occasional epistaxis and the erythematous patch on the nose, with troublesome sudamina, especially in the summer months.

Periodical blood examinations, the details of which would be tiresome, showed the lowest number of red blood-cells, 4,200,000, with hæmoglobin at 80 per cent. (September 21, 1896); the highest, 5,400,-000, and hæmoglobin at 90 per cent. (February 24, 1897). The lowest number of white blood-cells was 5632, the highest 8292. The differential count of the white cells during these years showed a normal percentage of polynuclears, large and small mononuclears, and eosinophiles.

During this period of four years he was treated with a number of drugs, including various preparations of iron, muriate of quinine in large doses, sodium and strontium iodide, ergotin, and mercury. He

kept fairly well to his arsenic and iron, and the spleen apparently showed no further enlargement. Being informed of this he married in 1897. During 1897 and the early part of 1898 he gained constantly in weight and looked the picture of health. From May, 1898, the spleen began to increase again in size and continued to increase, which it is doing even at the time of this writing, with a period of very rapid growth since the beginning of May, 1900. Numerous blood examinations were made during this period in which not even an anæmia of chlorotic type could be established, as the hæmoglobin was never lower than 80 per cent. Since October, 1899, yellowish, cuneiform, thickened patches of conjunctiva, similar to those of the sister, developed in each eye, the size of the patches being identical. The color of the healthy sclera is white. The patient is diminishing in weight, yet he says he feels perfectly well. In fact, he was very active in his business during this period, making trips into the country and out West, where he was compelled to rough it and live on all kinds of primitive food.

At no time were there any abnormalities in the urine.

With the enlargement of the spleen the liver kept pace, both pushing upward against the lungs and forcing the heart upward and to the right.

No enlarged glands can be felt anywhere. With the exception of an attack of indigestion in January, 1900, he did not require any medical service.

In August of this year, while at Avon, N. J., where he had spent the past two summers, he was seized with a chill, his temperature speedily rose to 106.5° F., and he became delirious. During this attack he was treated by the local physician, who pronounced his disease, according to the patient's statement, as " bloody dysentery." I was informed that the patient had numerous loose evacuations from the bowels containing blood and mucus. He was greatly weakened and emaciated by this attack, which was followed during convalescence by an attack of hemorrhagic furunculosis similar to the one which followed the attack of typhoid in the sister, the signs of which are still visible in the pigmentation of the skin wherever there had been a furuncle. On his return to the city he consulted me, when a physical examination revealed the following:

Status on October 3, 1900. There is considerable emaciation. The skin of the face, especially on the forehead, shows pigmented spots and a few healing hemorrhagic furuncles. Pigmented spots most marked over anterior surfaces of the legs. A few hemorrhagic furuncles are on the outer side of the left leg and thigh. A few pigmented spots on the chest, abdomen, and arms are seen. The color of the skin is a sort of brownish-yellow, not at all like icterus, very peculiar and different from any appearance of cachexia that I have ever seen. It is not the pallor of any of the forms of anæmia or of carcinomatosis. There is no pigmentation of the mucous surfaces of the lips, gums, or mouth. The tonsils are not large, and there are no enlarged lymphatic glands anywhere to be felt. The skin of the nose and of the adjacent sides of the cheeks is still livid red, and sudamina are distributed generally over the surface of the body, which is moist. No pain or tenderness can be elicited by pressure over the bones.

The shape of the patient's trunk is more anomalous than ever, the bulging in the regions of the liver and spleen being much more pro-

nounced, giving to his entire trunk the shape of a barrel. His chest is thirty-four inches in circumference, his upper abdomen thirty-seven and a half inches, and the lower, at the waist, thirty-three inches (Fig. 3). Pulse, 100, soft, and shows no increased tension The respirations are hurried, 30 to the minute, short, and somewhat labored. (He never had dyspnœa before.) This is due partly to the pressure of the enlarged organs upward, but greatly to the anæmia, which the examination of his blood will later show.

The apex-beat of the heart is in the *third interspace*, 3 cm. to the right and above the nipple. The upper border of cardiac dulness is at the lower border of the first rib, the right border over the middle of the sternum. The beat is fairly forcible. There are no cardiac murmurs.

FIG. 3.　　　　　　　　　　　　　　FIG. 4.

The lungs show marked dulness from the fifth rib downward, with diminished breathing and absent voice. There is no fluid in either pleural sac. The dulness is due to the compression.

The abdomen protrudes in front, the sides above bulging to a great extent. There is marked tenderness over the liver in spots and a similar tenderness over the spleen, especially below the costal margin.

The area of splenic dulness begins above, at the upper border of the fifth rib, in the midaxillary line, and can be traced behind to the spinal column (Fig. 4), which it touches at the seventh dorsal vertebra.

The posterior edge of the spleen can be distinctly palpated below the twelfth rib, where it rests along the lumbar vertebra, and then curves forward to be finally lost to the touch behind the crest of the ilium. In front the anterior edge of the spleen emerges from the costo-chondral border in the parasternal line and proceeds downward and toward the mesial line, which it reaches at 3 cm. above the umbilicus, where it presents a distinct notch; from the notch the border proceeds transversely across the mesial line of the abdomen, bends down suddenly and curves 4 cm. beyond the middle line back again to the lateral part of the iliac region, where it meets the posterior border behind the crest of the ilium.   The accompanying photograph, with the borders of the organ marked on the skin being mapped out by palpation and percussion, shows the enormous size of the organ better than a description (Fig. 4).

The liver dulness begins above in the mammary line, in the fourth interspace; the lower border of the liver can be easily felt; it extends to 6 cm. below the costal margin in the same line and 8 cm. in the anterior axillary line.   It distinctly bulges out the right lower thoracic and upper hypochondriac regions.

The surfaces of the spleen and liver are uniformly smooth and present neither nodules nor irregularities.   There is no ascites, nor has there been any œdema anywhere.

The superficial veins of the abdomen are not unduly prominent.

The urine is normal in amount; its color is yellow, specific gravity, 1020; urea, four grains to the ounce; no albumin, no casts, no sugar, no bile; some indican.

The blood examination reveals a considerable reduction from former examinations in the red cells and in the hæmoglobin.   Red cells, 3,800,000; white, 5,120; hæmoglobin, 55 per cent., showing an anæmia of chlorotic type.   The differential count shows polynuclear neutrophiles, 54 per cent.; large mononuclears, 10 per cent.; small mononuclears, about 36 per cent. (a little less), and eosinophiles, 0.25 per cent.   There were no nucleated red cells, no poikilocytosis.   A very few microcytes were visible.

There has been no fever since the third day after his chill, in August, 1900.

DIAGNOSIS.   The distinctive features of the last two cases are—

The enormous enlargement of the spleen, that of the sister being larger than that of the brother.

The enlargement of the liver, that of the brother being the greater.

The profuse perspiration and sudamina.

The *absence* of anæmia for more than ten years after the disease had been established.

The tendency to hemorrhage, manifested in the occasional oozing of blood from the gums in the sister, in an occasional epistaxis in the brother, and in the attack of hemorrhagic furunculosis in each.

The peculiar brownish-yellow (non-icteric) color of the skin.

The long duration of time since the disease began.

The feeling of comfort and ease, notwithstanding the enormous size of the spleen and the pressure upon the thoracic viscera.

The yellow, wedge-shaped conjunctival thickening on each side of the cornea of each eye; these do not in either case look like pingueculæ.

This complex of symptoms, it will be shown, is sufficient to exclude these cases from the group of cases of splenic anæmia and justify placing them in a special group.

Chronic enlargement of the spleen is not rare. In fact, in malarial districts of the Southern States it is quite common and is familiarly known there as the "ague-cake." In such cases it seems to bear a direct relation to the intensity and virulence of the malarial infection.

It also occurs in interference with the portal circulation either directly, such as in cirrhosis of the liver, portal thrombosis, continuous pressure on the portal vein from any cause, etc., or indirectly through the interference with the venous circulation as a result of cardiac disease.

It occasionally occurs as a manifestation of syphilis, rachitis, and tuberculosis.

Amyloid disease of the spleen produces a considerable enlargement of the organ. It is the secondary consequence of suppuration in some other part of the body. Enlargement accompanies leukæmia, Hodgkin's disease, and occurs in splenic anæmia. It is also due to abscess and echinococcus invasion of the spleen.

Lastly, a chronic enlargement of the spleen occurs, with new growths arising in the organ either primarily, which is uncommonly rare (primary carcinoma or sarcoma has seldom been observed), or secondarily from metastasis from other organs (even secondary carcinoma or sarcoma is quite uncommon).

In our cases we have been unable to determine to what the splenic overgrowth is due. From the clinical history malaria, rachitis, tuberculosis, and amyloid disease can be eliminated. The absence of fluctuation determines that the enlargement is not an echinococcus cyst. The duration of the disease excludes all the forms of malignant neoplasms. The absence of heart disease and of primary cirrhosis of the liver excludes a hyperplasia due to passive congestion, as does the tremendous size of the spleen in our cases. Banti's disease, which is a cirrhosis of the liver accompanied by a splenomegaly, is entirely unlike this group. The result of the blood examinations positively excludes leukæmia.

Cases of splenic anæmia have much in common with our group of cases and yet, I think, are very distinct. The features in common are the splenic enlargement, the occurrence in adult life, the chronicity of the affection, the hemorrhagic tendencies, and, perhaps, the anæmia. In splenic anæmia the duration of the disease is much shorter than in our group. In the former the average length of life after the discovery of splenic enlargement is two years; in the latter it has not as yet been determined, but two of my cases present a prolonged progres-

sive splenic overgrowth, in one for at least eleven years, in the other for fifteen years, the patients being still in a fair condition of subjective health. Osler[1] has reported a case of splenic enlargement and anæmia which lasted at least twelve years, and which was accompanied by a high degree of anæmia of the chlorotic type and by repeated attacks of melæna and hæmatemesis. The spleen was not nearly as large as in that of any of my cases.

Anæmia is not a marked symptom in our group and began very late, only after an intercurrent affection, while it is an early and prominent symptom in the patients with splenic anæmia. Still, it should be mentioned that Osler says that anæmia was more commonly absent in his cases of splenic anæmia (THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1899, p. 54) than present (Osler, *Text-Book on Practice of Medicine*, article "Splenic Anæmia"). This fact might make some of his cases analogous to ours.

Patients with splenic anæmia have been at times amenable to treatment. Our patients have grown progressively worse, notwithstanding all methods and means of treatment.

The peculiar color of the skin in our cases is entirely different from the pallor of splenic anæmia.

I cannot say whether the peculiar conjunctival changes are pathognomonic of our group. I have never seen them mentioned as occurring with other forms of splenomegaly, nor have pingueculæ been described as occurring in such cases.

Quite characteristic of our group of cases is the feeling of comfort and well-being and the remarkable absence of any subjective signs of distress, even with the enormous overgrowth of the spleen and liver crowding up the thoracic viscera.

LITERATURE AND PATHOLOGY. When one comes to examine the literature connected with cases of primary splenomegaly he soon discovers the darkness in which the pathology of the spleen is concealed. The various non-leukæmic splenic enlargements have been variously denominated according to whether they were considered as heteroplastic growths or as a hyperplasia. The confusing nomenclature regarding the nature of primary splenomegaly arose partly from the various theories held by the different authors. Cases thus appear in the literature under the lymphatic tumor groups with the following various names: Lymphosarcoma (Virchow), malignant lymphoma (Billroth), malignant non-leukæmic lymphadenoma (Orth); also as Hodgkin's disease, adenie (Trousseau), pseudoleukæmia (Cohnheim), lymphatic anæmia (Wilks). Even the term splenic anæmia has been used to denote various conditions. Thus Griesinger, in describing a splenic form

[1] Edinburgh Medical Journal, May, 1899.

of pseudoleukæmia, called it splenic anæmia. He used the term for the first time. He was followed by others who gave the same name to cases of splenic enlargement in which there was no involvement of the lymphatic glands. A different significance was given to this term when von Jaksch described a series of cases occurring in children presenting the clinical complex of anæmia—intense leucocytosis, very large spleen, and, seldom, enlarged lymphatic glands. He called these cases "anæmia pseudoleukæmia infantum," while Somma had called the identical class of cases splenic anæmia. Glockner classified the same kind of cases under the same term as Somma. In describing his cases the last author speaks of the presence of numbers of peculiar epithelioid cells in the spleen pulp—a condition which Bovaird also described under different terms in his case and whose interpretation has puzzled all pathologists who have described these cells. They have not been able to say definitely whether the cells represented a neoplastic formation or not. Such authorities as Robin, Weichselbaum, Birch-Hirschfeld, and others have been unable to decide the question.

The only cases heretofore recorded which the writer believes are similar, if not identical, to his cases are six in number. They are described by Gaucher,[1] Picon and Ramond,[2] William Collier,[3] Weichselbaum,[4] and Bovaird.[5] The last named, in his recent article, has referred to these cases so fully that it is needless to reconsider them.

I think it is fair to assume that the child, the youngest of my three cases, who died at nine years of age with a splenic enlargement, was a case of this disease. If we can accept the case of Weichselbaum—one of a soldier from whom a very large spleen, which followed an injury to his side, was removed by operation, and which Birch-Hirschfeld regarded not as an endothelial sarcoma, as Weichselbaum called it, but an ordinary large-celled hyperplasia—as one of this disease, his and mine are the only cases recorded as occurring in males, the cases of Gaucher, Picon and Ramond, Collier, and Bovaird being in females.

Females seem to be more afflicted than males. Collier and Bovaird each report two females in each of their reported families as afflicted with the disease, while my cases are three in one family, two of them being males. The disease, perhaps, has a relation to some perversion of visceral development occurring in families.

The time of development of the disease in this group varies. In

[1] E. Gaucher. Thèse de Doctorat : "Splenomegalie primitive—Epithelioma primitif de la rate."

[2] Picon et Ramond. "Hypertrophie de la rate." Arch. de méd. exp. et anat. path., 1896, viii., 168.

[3] William Collier. "Case of Enlarged Spleen." Transactions London Pathological Society, 1895, xlvi., 148.

[4] Weichselbaum. "Primäres multiplen Endothelsarkom der Milz." Virchow's Arch., 1881, lxxxv., 562.

[5] David Bovaird, Jr. THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1900, cxx., p. 377.

one of my cases (in the child who died) it evidently began in the third year of life.   In the woman it cannot be definitely stated when it began, because no physical examination of the abdomen had been made until the enlarged spleen was apparent to her; it may be presumed, however, from the size when it was first discovered and its subsequent progress in growth that it began about three years before, in her nineteenth year.   In the man it positively did not begin until his eighteenth year. In this respect two of my cases differ from Bovaird's; in both of his it began in early childhood.   It likewise began in childhood in Gaucher's case.

It is not my intention to discuss the pathological anatomy of this group of cases.   The subject is still involved in doubt.   Bovaird's experience with his specimens and the various opinions expressed by the pathologists to whom he submitted them is but a repetition of the experience of Collier, Weichselbaum, etc.   None could say absolutely whether Bovaird's case represented an endothelioma, in the ordinary acceptation of the term, or a hyperplasia.   This doubt shows the difficulty of the problem.

From a clinical stand-point I may say that this affection of the spleen does not produce any serious altered blood states such as one would be led to expect in a destructive process involving the cells of the spleen.   Morphologically the spleen in these cases is still a spleen, and histologically the cell elements were much increased in number, giving rise to a true hyperplasia—conditions which are borne out by the clinical phenomena.

As to the increase in the size of the liver in these cases, the explanation is based on purely physical grounds.   I do not regard it as metastatic, notwithstanding in Bovaird's case the same kind of cells which had been found in the spleen were found in the liver.   Clinically, the increase in size is that of an ordinary hyperplasia.   When we consider that in my cases the hepatic enlargement was not coincident with but later than the splenic overgrowth, and that it occurred some years later in both the adult cases, we must look to the cause of the enlarged liver in the spleen.   The following facts will, I believe, explain it:

1. All the venous channels in the spleen were enlarged in Bovaird's case, and it is fair to assume they are in mine.

2. With the increase in the size of the spleen more blood is sent to it, and consequently more is returned from it through the splenic vein. As a consequence—

3. More blood is carried to the portal vein, which is formed by the junction of the splenic and superior mesenteric veins.   Hence the liver receives more than its natural portal blood-supply, the hepatic cells are put to greater activity in the necessary metabolism of this increased blood-supply, and a hypertrophy and finally a hyperplasia naturally

result. An analogous process occurs in the spleen in some cases of cirrhosis of the liver just in this way.

From what has been adduced it may be held that my cases correspond only with those described by Gaucher, Picon and Ramond, Collier, Weichselbaum (even doubtful), and Bovaird. While there is a similarity between the cases called splenic anæmia and some of this class reported by Sippy[1] and Osler, there are sufficient data to include our group of cases under a special class.

Gilbert and Fournier[2] mention seven cases of children with splenomegaly accompanied by cirrhosis of the liver and speak of them as cases of splenomegalic hepatic cirrhosis. They call attention to the stunted growth of the patients and to certain changes in the bones and joints.

Frederick Taylor[2] reports three cases similar in most of their features to those of Gilbert and Fournier. These cases while having much in common are yet not alike; some of the former seem to me to be cases of splenic anæmia and of Banti's disease. This is especially true of the first two of Taylor's cases, which are undoubtedly cases of Banti's disease. As to his third case, it approaches in only a few characters the group in which my cases form a distinct division and yet differs in many of its clinical features from mine. My cases were not stunted in growth, had no clubbing of the terminal phalanges, had no ascites, and no icterus. The peculiar color of the skin in my cases was of very late development, came on gradually, and increased in intensity slowly. There never was any bile in the blood or in the urine of my patients and their stools were never free from bile. On this account I do not regard their color as icteric. It does not look like any form of icterus that I have ever seen. The third case of Taylor's was jaundiced shortly after an attack of scarlet fever at the age of about eight years, after which his splenomegaly began and presented the signs of arrested development just mentioned. The spleen in my cases is larger than in any of the cases referred to.

There has recently been a discussion before the Société Médicale des Hôpitaux (April 1, May 2, 18, and 25, 1900) of cases of splenomegaly some of which were associated with a cirrhosis of the liver and some were not. M. Chauffard, in opposing the position taken by M. Gilbert on this topic, suggested the classification of such cases into three groups, viz.:

1. Cases in which the spleen and liver appear to be simultaneously affected and in almost equal degree. He suggests the name of splenomegalic hypertrophic biliary cirrhosis for this class.

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[1] THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, November, 1898.

[2] Gilbert et Fournier. "La cirrhose hypertrophique avec ictére chez l'Enfant." Revue mensuelle des Maladies de l'Enfance, 1895, No. xiii., p. 309.

[3] Frederick Taylor. "Cirrhosis of the Liver In Children." Guy's Hospital Reports, 1895, lii., p. 45; also 1897, liv., p. 1.

2. Cases in which the spleen is distinctly and markedly affected before the liver and to a much greater degree. In these cases the hepatic changes are secondary and dependent on the splenomegaly. He would call these cases metasplenomegalic hypertrophic biliary cirrhosis.

3. Cases in which the enlarged liver precedes and determines the splenomegaly—"presplenomegalic hypertrophic cirrhosis."

These French authors, however, have confounded the various types of disease which we speak of as hæmochromatosis (v. Recklinghausen), Hanot's disease, and diabète bronzé with some cases of splenic anæmia, and cirrhosis of the liver combined with splenomegaly (Banti's disease). I do not think any of their reported cases are like mine.

Nothing is gained by a classification such as M. Chauffard suggests, as it neither indicates the character, cause, or pathology of any of the diseases of the groups.

I can furnish no further explanation of this affection, and all that can be said about this special class of cases is that they represent probably a family disease whose essential characteristic is a progressive splenomegaly. When the physiology and pathology of the spleen become known it may be possible to refer this class of cases to its proper place in medical nosology.

ENTEROPTOSIS.[1]

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The ptoses of the different abdominal viscera are so closely associated, forming, as they do, parts of one great disease picture, that it is unscientific and unsatisfactory to select for discussion one dislocation, such as gastroptosis or nephroptosis, and thrust upon it, as is sometimes done, the dignity of a special disease. It is usually but one manifestation of enteroptosis. Almost never do we find gastroptosis without a dislocation of one or both kidneys, the colon, and the small intestines. Often there is also dislocation of the uterus, less frequently of the liver and the spleen. It is true that the symptoms and anatomical signs on the part of the stomach may predominate in one case, while in another those of the kidneys are the more striking. It is also true that though these organs may be greatly dislocated, the patient may complain of no symptoms that would direct special attention to them.

My experience with this condition during the past few years has con-

vinced me that it is a remarkably common disease, that it is very seldom recognized or examined for by the profession at large, and that a dissemination of knowledge of the disease would be of great worth to the profession and of untold value to suffering womanhood.

There is no disease of more importance to the general practitioner than enteroptosis, since it is endemic the world over, and he is usually first to be consulted by such patients. A familiarity with its symptom complex and a knowledge of the correct methods of diagnosis will relieve him of much worry and vexation of spirit by explaining many an obscure problem in practice.

The patients who are an easy prey to the allurements of patent medicines and quacks are often enteroptotics. They are well described in a patent medicine advertisement as flotsam and jetsam, driftwood —the patients who drift from one physician's office to another; who go the rounds of hospitals and finally give up in despair, reconciled to the belief that treatment of their condition is useless. This class of cases is the bane of the physician's life—the atonic, enfeebled, ill-nourished patients, so poorly equipped with vital force that every physiological function from digestion to thought is seriously impaired. The patient is literally and figuratively run down, as much so as a clock when its mechanism no longer furnishes the impetus to go. These are the cases which every day are being diagnosed as neurasthenia, spinal anæmia, nervous exhaustion, nervous dyspepsia, and change of life.

In this article I shall confine myself rather closely to a statement and discussion of the facts gleaned from an analysis of eighty cases of enteroptosis taken from the records of the medical clinic. I shall avoid citations from numerous authors and shall give but a brief history of the disease.

HISTORY. In 1853 Virchow called attention to the displacements of the intestines which arise through circumscribed peritonitis and obstruction of feces. While working upon diphtheritic dysentery he was struck with the frequency of the dislocation of the abdominal viscera. Indeed, his post-mortem experience led him to make the following statement: "In almost all adults partial states of dislocation of the viscera, and especially of the intestines, occur so frequently that more people have this displacement than a normal location of the intestines."

The intimate relation existing between a large group of symptoms and dislocations of the abdominal viscera entirely independent of inflammatory conditions in the abdominal cavity was first brought prominently before the medical profession by Glénard, of Lyons, France, in 1885. Although other clinicians—Stiller, for instance— claim to have been familiar with these cases long before the publication of Glénard's article, he is given credit for having given to enteroptosis the dignity of a distinct disease. Thus we may distinguish the enterop-

tosis of the clinician and the enteroptosis of the pathologist.   Glénard
devoted considerable attention to the *modus operandi* of the develop-
ment of enteroptosis, to the explanation of symptoms as secondary to the
anatomical conditions and to treatment.   Ewald and Boas proved that
the " cord colique tranverse " of Glénard was simply the normal pan-
creas, which is sometimes easily felt in these cases.   Einhorn and
Hemmeter have called attention to the frequency of enteroptosis in
patients complaining of dyspeptic symptoms.

Meinert examined a large number of chlorotic girls and concluded
that enteroptosis was a prime cause of chlorosis.

Stiller in particular has called attention to congenital enteroptosis
and has emphasized the nervous element in this condition.   In impor-
tant contributions he has called the attention of the profession to a
new sign, which he terms the costal stigma, or floating tenth rib.   All
patients possessing this sign are considered neurasthenic.   He believes
that the degree of movability of this rib is a fair index of the degree
of neurasthenia.   He believes enteroptosis and nervous dyspepsia to be
identical and uses the costal stigma as an easy means of recognizing
both.   He contends that Reichman's disease is closely related to
enteroptosis, accompanies its highest degrees, and depends, as it does,
upon a congenital predisposition.

One soon learns to recognize an enteroptotic at a glance.   She has a
slender frame, is poorly nourished, pale, tired, has a neurasthenic appear-
ance, drags herself about from morning until night, and is entirely
lacking in vivacity and energy.   Dunster's jocular definition of woman
as " a thing which is constipated and has a pain in its side " applies
to enteroptotics.

METHOD OF EXAMINATION.   Chest and abdomen are stripped and
a careful inspection made, the patient assuming both horizontal and
upright positions.   There is usually a depression in the epigastrium
and a fulness below the navel, especially in the upright position.

In nearly all these cases palpation is very easy on account of the
relaxed condition of the abdominal walls.   Occasionally it may be neces-
sary to put the patient in a hot bath at 110° F. to make palpation
easier.   Feel for the tenth ribs to determine whether the costal stigma
is present.   Palpate the kidneys according to well-known methods laid
down in text-books.   Examination of the stomach comes next in my
routine.   I have found that percussion and auscultatory percussion are
entirely unreliable for locating the greater curvature in enteroptotics.
If the stomach is in its normal position they are fairly satisfactory,
especially the latter method.   Frequently, using auscultatory percus-
sion, I have noted a change in the tympanitic note just above the
navel, suggesting that this was the location of the greater curvature.
Inflation a moment later demonstrated that this was the lesser curvature

in a dislocated stomach. The demonstration of succussion sounds in the region of the navel is very suggestive of a dislocated, dilated, or atonic stomach. The sounds, however, may come from the intestines. Inflation of the stomach by one of the several methods is the most satisfactory way of demonstrating its size and position. Among the methods in vogue is the tartaric-acid and bicarbonate-of-soda method, the patient drinking half a glass of water containing 6 grammes of acid and following immediately with a similar amount containing 7 grammes of soda. Carbonic acid is generated and the stomach is distended.

Another method is inflation through a stomach-tube by means of a Davidson syringe, Politzer air-bag, atomizer bulb, or bicycle pump. Some physicians prefer attaching a French safe or rubber balloon to the stomach-tube, by this means preventing the escape of air either by way of the duodenum or œsophagus. The advantage in this method is that the amount of air introduced into the stomach can be easily controlled. The disadvantage is that the patient, unaccustomed to the use of the stomach-tube, complains of pain before the stomach is fully distended, and in many cases it is necessary to let the air out before determining the position and size.

Spivak, of Denver, recommends auto-insufflation by the patient. A stomach-tube perforated just within the portion covered by the lips is introduced, the distal portion being compressed, and the patient is told to blow. Occasionally the physician applies his own lips to the tube and blows.

My experience with the acid and soda method has been quite extensive and very satisfactory. It will be found much more useful in private practice than the others, since it is much easier to persuade a patient to swallow a couple of doses of medicine than a stomach-tube. Frequently one wishes to distend the stomach when it is inconvenient to give a test-breakfast.

The auto-insufflation method I have never used. From my experience with neurasthenic women I do not believe they would prove successful auto-inflators. Some theoretical objections are offered to the acid and soda method. In some cases of marked dilatation of the stomach it is true that the usual dose is not large enough. In one such case I found it necessary to double the dose in order to obtain good results. Inflation through the stomach-tube is very useful in cases of dilatation. The patient seldom vomits unless the stomach is distended immediately after meals. Some distress occurs, but this is relieved immediately by belching, the patient sticking her finger down her throat if necessary. In the several hundred cases which I have distended by this method neither hemorrhage nor other unfortunate result has followed, and among the cases have been a number with

cancer of the stomach.   Transillumination can be used, but it is not as satisfactory as distention.

It is well to palpate the liver and spleen in both the upright and horizontal positions.   These organs may appear dislocated only in the upright position.   The pancreas is often felt by the educated hand from one to two inches above the navel.   Such an examination consumes a very few minutes.

The statistics which follow are the results of an analysis of eighty cases of enteroptosis taken from the records of the medical clinic. With but a very few exceptions I have examined these cases myself and thus speak from a personal experience rather than from the records of others:

	Total patients.	Total men.	Total women above 16.	Enteroptosis in men.	Enteroptosis in women.
Last three months of 1892	68	48	20	0	0
Entire year of . . . 1893	207	157	50	1	0
" " 1894	258	154	84	0	0
" " 1895	238	180	58	1	2
" " 1896	189	144	45	3	0
" " 1897	252	179	73	6	0
" " 1898	288	198	90	12	1
" " 1899	362	259	103	35	4
First four months of 1900	142	96	46	11	4
	2004	1415	569	69	11

From October, 1892, to the end of December, 1896, only seven cases are recorded.   Since the latter part of 1897 I have paid more attention to the demonstration of this condition, especially during the past two years, with the result that the number of cases has increased remarkably.   Thirteen cases were recorded during 1898, 39 during 1899, and 15 during the first four months of 1900.   It is evident that accurate statistics can be obtained only by a careful routine examination of all cases, as there is a large number of the so-called cases of compensatory enteroptosis—patients with the anatomical conditions, but minus the symptoms. Realizing that enteroptosis was much less common in the male and more difficult to recognize, on account of the rigid abdomen, I have distended the stomachs only in those whose symptoms pointed directly to that organ.   If my examinations had been more frequent it is quite probable that the number of cases observed in men would have been much larger.

In this series of 80 cases 69 were women and 11 men.   In 24 cases both kidneys were dislocated, the right usually showing greater dis-

location than the left. As a rule, they were freely movable, it being possible to grasp the entire organ by the palpating hands. In 33 cases the right kidney alone was dislocated; in some only the lower half could be felt on deep breathing. In 4 cases the left kidney alone was dislocated. In 7 cases no notes concerning dislocation were found.

Only lately have I been paying special attention to Stiller's phenomenon—the costal stigma or floating tenth rib. In 8 cases the tenth ribs were distinctly floating; in 7 cases they had membranous attachments; in 65 cases there were no notes, as these patients were examined before special attention was called to this sign.

Position of the Stomach. In 69 of the 80 cases the stomach had fallen from its normal position. In 28 there was a high degree of dislocation, the entire organ lying below the navel. In 41 the prolapse was of moderate degree, the greater curvature being from two to three inches below the navel, the lesser from one to two inches above. All save 12 of these cases were distended with acid and soda. In the 12 not distended succussion sounds were present below the navel. In 3 of the 80 cases the stomach was not dislocated; in 8 there were no notes on this point. In a few cases there was both dislocation and dilatation. In several cases the colon was inflated and was found to have fallen toward the middle line and below the navel.

Analysis of the Stomach Contents. Thirty-six out of the 48 cases analyzed had a total acidity of 50 or below, 2 between 50 and 60, 4 between 60 and 70, 3 between 70 and 80, and 3 between 80 and 90. There were no notes on 32 of the 80 cases. These figures are based upon our old method of determining total acidity, which differs from the method used during the past year, in that formerly—using phenolphthalein as an indicator—the reaction was considered complete when addition of the decinormal NaOH solution produced the faintest pink. At present the reaction is not considered complete until a pink is obtained which does not deepen on the addition of NaOH. This means an additional two or three drops of the decinormal solution.

Using the method in vogue during the past year, a complete stomach analysis has been made in 16 of our cases. Of these 9 had a total acidity of about 50 or below, 7 above 50.

Blood. Examination was made in 23 cases. Of these 9 had a chlorotic condition; 13 were more or less anæmic, but not chlorotic; 1 was normal; 57 had no blood notes. In 13 of the 23 hæmoglobin was 70 or above; in 10 it was below 70.

Confinements. Thirty-five out of 56 women bore children, varying in number from one to eight; 20 never bore children; 1 had an abortion. In 13 there were no notes.

Age. In the second decade, 1; in the third, 32; in the fourth, 19;

in the fifth, 20; in the sixth, 7; in the seventh, 1. The oldest was sixty-seven, the youngest sixteen.

The symptomatology of these cases was extremely varied. In a few there were no symptoms other than a loss of weight, strength, and energy; in their words, simply "run down." In a much larger class the nervous symptoms predominated. Some of these cases were depressed, even melancholy; others very nervous, excitable, and irritable, showing various hysterical phenomena. They complained frequently of palpitation of the heart and forcible pulsation in the abdominal aorta. (In several such cases with which I am familiar a diagnosis of aneurism of the abdominal aorta was made.) Some of these patients are nervous wrecks. They can scarcely endure the sight of their own children. They are unfitted for ordinary social intercourse and domestic responsibilities.

In a third group of cases, in addition to the general symptoms of neurasthenia, there are striking symptoms on the part of the stomach or kidneys. There may be poor appetite, coated tongue, nausea, and vomiting, feeling of fulness and distress after eating, borborygmi; in some periodical attacks of gastralgia, even suggesting gallstone colic or Dietl's crises. In nearly all chronic constipation and sick headache are constant symptoms.

Illustrative Cases.

CASE I.—Mrs. P., aged twenty-six years, housewife; one child. No symptoms on the part of the stomach, no nervous symptoms. She came to the hospital because of amenorrhœa. Stomach entirely below the navel; both kidneys easily felt.

CASE II.—Mrs. C., aged twenty-eight years, housewife; complains of general weakness, loss of weight, dizziness, chilly sensations, aching and soreness of the flesh, and distress in the region of the stomach. Had measles, diphtheria, and typhoid fever when a child; was married at eighteen years; has had three children and one abortion. Present trouble began ten years ago with spells of nausea and chilliness, occurring two and three times a week and gradually increasing in frequency until they occurred several times daily. Appetite and digestion were good; bowels constipated; had palpitation of the heart; could feel pulse in any part of the body. Occasionally there is severe pain in the back. The stomach lies entirely below the navel; the colon is greatly dislocated and both kidneys are easily felt.

CASE III.—Mrs. S., aged thirty-five years, housewife, married. From childhood had considerable gas formation, severe headaches, and vomiting. During the past three years has had numerous attacks, which were diagnosed as gallstone colic. First a tenderness is noticed in the region of the right kidney, then pain begins here, radiates to the lumbar portion of the spine, to the left kidney, and up toward the stomach, where it becomes very severe. Patient tries to vomit, has a convulsive attack, and faints away. Just before these attacks a large quantity of colorless urine is passed. The stomach and both kidneys are greatly dislocated.

Most of our enteroptotics have displacements of the uterus; a few suffer with mucous colitis, but this condition is probably secondary to the uterine trouble.

Stiller believes that there is a close association between tuberculosis and enteroptosis. I have noticed it in a number of cases. Enteroptosis might easily occur as a result of the wasting of tuberculosis. However, I believe that enteroptosis can be demonstrated in most women with tuberculous habitus before the lung disease has asserted itself.

From a study of this series of cases I think I am justified in stating that there is no etiological connection between enteroptosis and chlorosis. Meinert might with as good reason decide that chlorosis caused enteroptosis as the reverse. Most cases of enteroptosis are anæmic, but do not have the special variety of anæmia termed chlorosis. Chlorosis is often met with in persons without enteroptosis, and many enteroptotics do not have chlorosis.

Most authors mention the frequency of hyperacidity in enteroptosis. Stiller thinks there is a close connection between Reichman's disease and enteroptosis. According to my series of cases subacidity was more often present than hyperacidity. I believe that congenital cases of enteroptosis are most likely to show hyperacidity.

ETIOLOGY. The large number of women in our series who have never borne children (20 out of 56)—the large number who have never practised tight-lacing, who give no history of falls, heavy lifting, wasting diseases, or operations upon the abdomen—convinces me that there is in many a congenital predisposition to this disease. This class of cases usually shows Stiller's phenomenon—the floating tenth rib. There is a congenitally relaxed condition of the peritoneal attachments and a lack of muscular tone.

The acquired or secondary cases are more numerous, but it is difficult to determine in many to what extent a predisposition might have aided the so-called exciting cause. In many such there is a lack of tone in the tissues which makes it possible for trifling causes to produce this condition. Such etiological factors are: All conditions tending to diminish intra-abdominal pressure; frequent child-bearing, ascites requiring tapping, operation for abdominal tumors, etc. Severe infectious diseases, and chronic wasting diseases weaken the abdominal muscles and cause a disappearance of fat, resulting in a relaxation of peritoneal attachments. Straining at stool is a cause which is usually not recognized.

TREATMENT. The greater one's experience with enteroptosis the more conservative and guarded his statements as regards treatment and recovery. All floating kidneys and dislocated stomachs are not to be stitched into place; in fact, only a well-chosen few are benefited by

such operation. I will venture the assertion that the majority of cases operated upon for floating kidney were never examined as to whether stomachs and colon were not likewise dislocated. In most cases of general enteroptosis nephrorrhaphy will be of no benefit. I am familiar with several striking examples which illustrate the truth of this statement.

In gynecological practice a large number of women with displacements and torn perinei have distressing nervous symptoms. The specialist, taking a narrow view of the case, performs anterior fixation, uses pessaries, repairs the perineum, and is disappointed in the results of his treatment. Many of these cases are enteroptotics, and the symptoms are as much dependent on dislocated stomach, kidneys, and intestines as upon retroversion and anteflexion. Operation is advisable in cases accompanied by hydronephrosis and Dietl's crises, in which we have pure mechanical disturbances resulting from a kinking or twisting of the kidney vessels which could occur only when this organ was dislocated. Stengel and Beyea report a case of apparently congenital enteroptosis, whose symptoms were chiefly gastric, in which nephrorrhaphy performed by J. William White did not relieve the symptoms, though the kidney remained in place. Later, the operation of taking a tuck in the gastrohepatic omentum and gastrophrenic ligament was performed and the stomach brought into what seemed almost normal position. Following this operation the stomach symptoms were relieved, the patient was able to eat freely without discomfort, appetite improved, and she gained nineteen pounds. Eight months after operation the greater curvature was one and a half inches below the navel.

In cases having severe gastric symptoms requiring morphine and not relieved by other means at our command, such an operation should be considered.

Abdominal bandages or belts with properly applied pads may relieve symptoms in some cases. They should be applied with the patient in the knee-chest position or lying on her back, with the hips elevated. Reclining in bed often relieves the dragging sensation. In some cases in which the stomach symptoms are prominent, occasional lavage and the use of dilute hydrochloric acid (if there is subacidity) are useful. Exercise and massage of the abdominal muscles are of great value, but can seldom be satisfactorily carried out. I have seen many cases improve remarkably under the use of tincture of nux vomica. The method in vogue in Dr. Dock's clinic is to begin with 10 or 15 drops before each meal, increasing 1 drop daily until as high as 70 or 80 drops are taken. This medication should be combined with overfeeding. The general tone of the system is greatly improved, the nervous symptoms especially being relieved; the patient puts on flesh and in every way, with the exception of the dislocations, is greatly benefited.

If the stomach is dilated or if there is retention of food as a result of kinking in the duodenum, gastric lavage should be used as indicated. There must be a great deal of individualizing in the treatment of this condition.

THE ESTIMATION OF THE URINARY SULPHATES AND OF THE FECAL FAT IN THE DIAGNOSIS OF PANCREATIC DISEASE.

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A REDUCTION in the amount of ethereal sulphates in the urine has been thought to be a possible sign of pancreatic disease, for the following reasons: The production in the intestine of the substances which are finally largely excreted in the urine as so-called ethereal sulphates, is dependent upon the putrefaction of protein, and this process is due to bacterial activity. Bacteria are able to break down native albumen in only relatively small amounts, while they readily decompose comparatively large amounts of the products of proteolytic digestion. If, therefore, there were little or no proteolytic digestion going on in the intestine, as is the case in severe disease of the pancreas, the produccts of bacterial activity (the indol, skatol, etc.) would be largely decreased, and there would, consequently, be a reduction in the ethereal sulphates of the urine. The brief literature concerning the value of estimation of the ethereal sulphates will be reviewed after the report of two cases which are of some interest in this connection, since in both the diagnosis was ultimately made clear—by the post-mortem examination in one instance and by the subsequent clinical course in the other.

The first case occurred in a man, aged thirty-six years, who was under Dr. Stengel's care at the University Hospital. He gave a history of spasmodic attacks of colicky pain above and to the right of the umbilicus, radiating toward the left. The first attack occurred in May, 1900. The pain was subsequently felt a number of times, though the first attack was decidedly the most severe. There was an indefinite history of slight jaundice accompanying the attacks. Between the time of the first spasm of pain and his admission to the hospital in November there was a loss of about forty pounds in weight; but, excepting for the emaciation and the attacks of pain, the only symptoms had been indefinite but continuous discomfort in the epigastric region and severe constipation. Upon admission nothing could be discovered by physical examination with the exception of slight enlargement of the stomach, absence of HCl from the stomach contents, and slight stagnation of the contents.

Oppler-Boas bacilli, lactic acid, and pus cells were absent from the stomach contents. The liver seemed normal. Nothing abnormal could be felt anywhere; there was, however, slight tenderness on deep pressure in the lower epigastrium. A few days after admission the man began to show jaundice, which was slight at first, but increased rapidly and became intense in about a week. There was a very rapid increase in the signs of stagnation in the stomach, and in the enlargement of the stomach, together with the appearance of violent peristaltic movements of this viscus. The constipation was pronounced and difficult to overcome. The most striking symptom exhibited was an astonishingly rapid loss of strength and flesh. During the last two weeks of his life deep resistance, without any definite limitation of its borders, was felt in the lower epigastrium. The case was thought to be pancreatic carcinoma, and estimations of the preformed and ethereal sulphates of the urine were undertaken, and orders were also left for the feces to be sent to the laboratory. Unfortunately, these orders were not carried out. Estimation of the sulphates gave the following figures: Preformed, 2.495 grammes; ethereal, 0.085 gramme. On a second day, preformed, 2.3086 grammes; ethereal, 0.115 gramme. Further estimations could not be made, as I was obliged for several days to be out of town. The absolute values for the ethereal sulphates are very low, and the ratio between the ethereal and preformed sulphates is also in both instances decidedly below the normal, particularly in the first estimation; the normal ratio is about 1 to 10 or 1 to 12, while in this case on the first day the ratio was 1 to 29.4 and on the second day 1 to 20. The man was operated upon two days after the last estimation, and an obstruction of the duodenum and a small mass in the position of the pancreas were found. Gastro-enterostomy was done. The man did well for thirty-six hours and then collapsed and died. Only a partial post-mortem was allowed. This showed a carcinoma of the head of the pancreas completely obstructing the biliary and pancreatic ducts, the latter being absolutely closed for the distance of half an inch at its terminal portion, and behind this being dilated to a diameter of about a quarter inch. There was apparently no accessory pancreatic duct, and hence the obstruction was complete. There was no calculus. The growth had involved the intestinal wall and had caused contraction of the lumen to about the size of one's little finger. The portion of the duodenum above this was much dilated, the pylorus stretched to a diameter of an inch and a quarter, and the stomach widely dilated. There was severe gastritis, with hemorrhagic points scattered over the surface of the stomach, particularly in the pyloric region. The stomach was entirely free from carcinoma. There were a few enlarged glands in the neighborhood of the pancreas. The liver was moderately enlarged, but showed no metastases.

The second case was that of a woman, aged forty-eight years, whom I saw through the kindness of Dr. Musser and Dr. E. P. Davis. She had had some loss of general health and weight, with epigastric discomfort, and a slowly appearing and increasing jaundice, which had persisted at the time I saw her for about a month. There were no definite changes to be determined upon physical examination excepting slight enlargement of the liver, but the course of the case aroused suspicion of pancreatic carcinoma. The estimation of the urinary sul-

phates in this case showed on one day, preformed, 3.268 grammes; ethereal, 0.440 gramme; at a second estimation, preformed, 3.792 grammes; ethereal, 0.444 gramme. The ratio between the two was on the two days 1 to 7.4, 1 to 8.5. The absolute amount of the ethereal sulphates, therefore, was above the normal, and the ratio of the ethereal to the preformed sulphates was likewise above the normal on both days. A short time after I saw her she began to improve, and soon became entirely well and remains so now, one year after the period of her illness.

So far, then, as these two cases go they seem to indicate that a reduction of the ethereal sulphates of the urine may be a sign of value in the diagnosis of severe disease of the pancreas. The observations by themselves are, however, of little value, and the literature upon the subject is meagre. According to Oser, the first practical suggestion of this sign was in the observation by Gerhardi, in 1886, that in a case in which there was apparently obstruction high up in the intestinal tract the indican in the urine instead of being greatly increased, as is usually the case in such conditions, was almost absent. Gerhardi decided because of this that the obstruction was due to malignant disease of the pancreas involving the wall of the intestine. The post-mortem showed the correctness of his view.

Subsequently Pisenti ligated the duct in dogs and showed in two cases that this caused a marked reduction of the indican (which was estimated quantitatively). Stefanini and Biondi each reported a case of pancreatic disease, one suppurative pancreatitis, the other adenoma, in which indicanuria was absent. Schlagenhaufer, however, found the indican increased in a case of interstitial syphilitic pancreatitis. Katz, in the various experiments which he performed with Oser, usually found that lesions of the pancreas caused rather an increase of the indican than a decrease, and de Renzi could not find any distinctive change in the indican in experiments on animals. Oser decides that one is not justified in drawing any conclusions concerning the presence or absence of pancreatic disease from the observation of changes in the amount of indican. With this conclusion everyone must agree, as the indican of the urine is a very uncertain quantity and as a factor in diagnosis is of extremely limited value; but while a rough test of the amount of indican, or even its quantitative estimation, is by no means a satisfactory diagnostic measure, the accurate quantitative estimation of the total ethereal sulphates is of distinct value in many conditions. There have been, however, but few observations concerning the sulphates in the condition under discussion. The first was that of Le Nobel, in 1888, who found that in a case in which there was a glycosuria (probably maltosuria), with very fatty stools and without icterus, the ethereal sulphates were almost entirely absent from the urine, and the intestinal contents showed a practically complete absence of indol,

skatol, and phenol. The salts of fatty acids were also absent from the feces, and Le Nobel believed that there was severe pancreatic disease which accounted for these changes. His diagnosis was never confirmed by post-mortem examination. A. E. Taylor showed very low values for the ethereal sulphates in a case in which the presence of cachexia and icterus, with absence of signs of gastric carcinoma or of distinctive signs of disease of the liver or bile passages, made it seem probable that there was pancreatic carcinoma. Taylor also was unable to report a post-mortem examination. Northrup and Herter described a case in which there was a mass in the region of the pancreas and the general signs of carcinoma ; operation showed a growth which was apparrently of the pancreas itself. Herter reports that in this case the ethereal sulphates were not reduced ; they were, on the contrary, increased, and particularly in proportion to the preformed sulphates. Katz found the absolute amount of the ethereal sulphates after severe experimental lesions of the pancreas, and particularly after total or partial extirpation, variable but not greatly differing from the normal. Their ratio to the preformed sulphates was also very variable, sometimes very high and sometimes low, but never extremely low and not showing any constant tendency to be low. So far as I have been able to determine there have been no other observations concerning the test.

The summary, then, of the observations is as follows : Katz found it valueless in experimental work on dogs. Northrup and Herter found it negative in a case in which operation apparently showed a large tumor of the pancreas, while Le Nobel and Taylor found it positive in cases in which pancreatic disease may practically be accepted as present (particularly is this statement true in Le Nobel's case), and I found it positive in one case in which autopsy showed obstruction of the pancreatic duct and negative in one in which there was apparently only a protracted catarrhal jaundice. While Katz's work is important, I cannot by any means consider it so conclusive as do Katz and Oser. Observations made upon animals that have been subjected to grave operative procedures cannot alone conclusively settle questions relating to chronic diseases in man. Only a series of observations on man himself will suffice to determine the actual practical value of any test, and the very few reports of this character which I have quoted are apparently in favor of this test. Northrup and Herter's case, which gave a negative result, cannot be considered to be testimony against it, for since an autopsy was lacking it is not known whether the pancreatic duct was obstructed or not, though it probably was.

But looked at more broadly I think the test is, at best, likely to be only an inconstant aid in diagnosis and to be of real value only when positive. Normal or unduly large amounts of ethereal sulphates may certainly be conceived of as being produced even in the absence of

pancreatic secretion from the intestine, since it is known that many bacteria have the power of breaking up undigested protein and may, therefore, produce indol, skatol, and their congeners without the aid of the normal digestive ferments. It is not known to what extent this may occur in the intestinal tract or what proportion of the normal amount of urinary sulphates may be furnished in this way in either diseased or normal conditions. It must be accepted as probable, however, that the amount thus produced may be sufficient to make a negative result of the test of no value as an indication of the absence of serious pancreatic disease. In the same connection it must be remembered that some pancreatic secretion may still be furnished to the intestine when there are severe inflammatory or degenerative changes in the organ, and that small amounts of the secretion may be sufficient to make the test negative. Further, it has been strongly insisted upon by Hansemann and others that new growths of an organ may to a considerable extent carry out the secretory functions of that organ, and this may be considered to be conclusively proved. Sufficient testimony of this is seen in the repeated observation of the secretion of bile by new growths of the liver; striking evidence of this is furnished in the case recorded by M. B. Schmidt, in which channels containing bile and surrounded by cells having the appearance and arrangement of liver cells were found in a sternal metastasis of a liver growth. A similar but even more remarkable observation was that of v. Eiselsberg, who noted the onset of symptoms of myxœdema after removal of the thyroid because of a malignant growth, the subsidence of the myxœdema during the growth of a metastasis, and the recurrence of the symptoms after the removal of the metastasis. The latter proved to have a structure closely resembling that of the thyroid, with acini filled with colloid material. Unless, therefore, a growth of the pancreas completely obstructs its duct the secretory function of the organ may possibly be fully carried out by the remainder of the pancreas or by the growth itself, and any tests of that function may give normal results.

On the other hand, a positive result of the test would not always be conclusive, since values for the ethereal sulphates as low as 100 mg. in the twenty-four hours have been observed by Strauss and Phillipsohn, Rovighi, Winternitz, Biernacki, Hirschler, Krauss, and others as a result of gastric hyperchlorhydria, closely restricted diet, diarrhœa, and other causes.

If, then, these causes for reduction of the ethereal sulphates are present a positive result of the test would also be of doubtful importance; hence the actual value of the test must be limited, but this does not mean that it is wholly worthless. There is scarcely a test used in clinical medicine that does not have to be carefully scrutinized in the individual case, and in so obscure a condition as pancreatic dis-

ease usually is clinically any test that promises to give aid in diagnosis is worthy of investigation.   More observations must be made before definite conclusions can be reached, but it seems probable that we shall be justified in acting as follows: If the test is negative the result deserves little consideration; if, on the other hand, the ethereal sulphates are found much reduced the other factors in the case should be considered in connection with this observation. If there is diarrhœa or gastric hyperchlorhydria, or if the patient is on milk alone or any other diet which very largely reduces bacterial activity, a low ratio of the ethereal sulphates cannot be considered of great importance, nor can much stress be laid on a low absolute value of the ethereal sulphates if the values for the preformed sulphates be coincidently low. If, however, these factors be not present, and particularly if, with suspicion of pancreatic disease, factors which usually cause an increase of the ethereal sulphates be present and yet the values be found low, the test would at present appear to be of distinct practical importance in diagnosis. Constipation, gastric hypoacidity or anacidity, icterus, grave anæmia, and cachexia are all very likely to cause an increase in the relative or absolute values of the ethereal sulphates.   All these factors were present in my first case, and yet the absolute value for the ethereal sulphates was low on the second day of estimation and very low on the first day, while the preformed sulphates were relatively and absolutely high. This result was considered to be a point of distinct importance in the diagnosis of this case, and I believe it would be of importance under similar circumstances.   The test does not require more time or skill than one often needs in the diagnosis of new growths by the examination of sections, though it does require rather more concentration of the time expended and a little special skill in chemical work.

AS TO THE IMPORTANCE OF FATTY STOOLS IN THE DIAGNOSIS OF PANCREATIC DISEASE.

The general clinical teaching concerning this matter is an instance of the not uncommon but unfortunate persistence of a belief far beyond the time when it has been proved that it is incorrect. Since Claude Bernard first stated that he had shown that the secretion of the pancreas splits fats, produces an emulsion of the same, and causes absorption of the fats, it has been customary in works on clinical medicine and clinical diagnosis to state, with a strange degree of absoluteness, that the presence of an excessive amount of fat in the stools is strong proof of the existence of pancreatic disease. Indeed, in a number of books one finds the curiously inaccurate statement that " the presence of fat in the stools " indicates disease of the pancreas. By this the authors must, of course, mean large amounts of fat, as it is well known that every normal stool contains some fat, and the expression is, therefore, merely

an inaccuracy in statement; but it is an unfortunate inaccuracy, for most students and many practitioners seem full of the belief that the presence of fat in the stools, whatever the amount, means disease of the pancreas. The question under consideration, however, really concerns the value of very fatty stools in the diagnosis of pancreatic disease.

Let me first quote the conclusions which Oser reaches after a consideration of the literature upon this point. His first conclusion is that steatorrhœa, as such, gives no justification for the recognition of disease of the pancreas. The second is that *if there is no icterus and no apparent disease of the intestine it is possible* that disturbed fat digestion is caused by pancreatic disease. Third, the probability that disease of the pancreas is present becomes more marked and can even approach certainty if, in the absence of icterus, steatorrhœa exists with other symptoms which point toward disease of the pancreas. Such symptoms are chiefly imperfect absorption of protein food, diabetes, or a tumor in the region of the pancreas. Fourth, imperfect absorption of the fat and coincident diabetes may be found in the entire absence of disease of the pancreas. Fifth, it is uncertain in how far disturbance of the normal splitting of fats may be looked upon as a pathognomonic symptom of disease of the pancreas. Fat splitting is undoubtedly a function of the pancreas, and Müller's cases indicate very positively that disturbance of fat splitting is a strong sign of pancreatic disease; but this question has not been sufficiently studied, and a positive conclusion cannot yet be reached.

In spite of the fact that Hartsen in animal experiments seemed to show that extirpation of the pancreas caused marked disturbance of the fat absorption and thereby seemed to confirm Claude Bernard's results, there is a great deal of testimony that this does not necessarily occur even under such extreme conditions, though the most important observations—those of Minkowski and Abelmann and of others who followed their methods—do seem to demonstrate positively that in animal experiments extirpation of the pancreas is followed by marked disturbance in the absorption of all fats except milk fats. It is not yet absolutely proved, however, that even extirpation of the pancreas has as a necessary result severe disturbance of fat absorption. The chief basis of the rather absolute teaching of clinicians seems to be the fairly frequent observation of the presence of fatty stools in cases which are, clinically, believed to be disease of the pancreas. The diagnosis of disease of the pancreas is, however, so insecure that it is surprising that clinicians have been so wedded to mere isolated observations without engaging in more careful study of the literature concerning experimental work and that concerning the conditions found in human subjects who showed other affections than disease of the pancreas. It is now fourteen years since a very important contribution by F. Müller showed very conclu-

sively that icterus of itself, unassociated with pancreatic disease but, of course, associated with absence of bile from the intestine, was accompanied by the passage of extremely fatty stools. In spite of the long period since this work was published, it is rather astonishing to see perpetuated in many of the most important works on general medicine and clinical diagnosis as well as in many special treatises on diseases of the pancreas the unvarnished statement that fatty stools are indicative of pancreatic disease. The most important fact which shows this teaching to be erroneous is that Müller's work and that of other observers, Walters especially, has demonstrated definitely that fatty stools can be seen in most cases of icterus in which the pancreas is entirely uninvolved. This had also been thoroughly demonstrated years before in experimental work on animals. But it must also be remembered that Müller showed, and his work has been confirmed by other observers, that severe disease of the intestine causes such pronounced disturbance of fat absorption as to give rise to the passage of stools that are very largely composed of fat.

The one observation which I have to report in this connection relates to the importance of icterus in the production of fatty stools. The second case to which I referred in discussing the sulphates was put upon a diet consisting solely of milk. The fat of the milk was estimated daily by the Leffmann-Beam method, the stools were marked off by charcoal, and three days' stools were collected, a strong solution of corrosive sublimate being added to prevent continued bacterial activity. The stools were evaporated to dryness. As they came to me the stools were completely acholic in appearance; they had a pale, grayish-yellow color, appeared to be composed chiefly of fat, and were extremely pasty and oily in consistency. After evaporation to dryness it was evident that they were composed almost entirely of fat, for even when the water was completely driven off moderate heating on a water-bath caused the whole mass to become completely fluid and to assume the appearance of oil. Upon cooling the stools became solid, but even when cold the consistency was much like that of a mass of pure fat. The total amount of dried feces in the three days was 184.69 grammes. Of this 154.18 grammes were shown by complete ether extraction in the Soxhlet apparatus to consist of fat. Hence of the total amount of dried feces 83.48 per cent. was fat. The patient during the three days ingested 250.8 grammes of fat, and the total amount of fat in the feces was 154.18 grammes. She absorbed, therefore, only 61.6 per cent. of the fat ingested, while normally as much as 90 per cent. is usually absorbed. This patient, as will be remembered, became entirely well soon after this observation was made, and it may therefore be stated, I think, that there was no pancreatic disease. There was, however, pronounced icterus, and it is almost unquestionable that the icterus alone caused the

marked disturbance of fat absorption.   This is only a single contribution to the work to which I particularly referred—that of Müller, in which he showed clearly that icterus causes profound disturbance of absorption of fats—but it serves to add emphasis to the statement quoted that poor fat absorption is of itself of no importance in the diagnosis of pancreatic disease if icterus is present; and in carcinoma—the most common disease of the pancreas—icterus is so frequently present as to make such a statement one of great importance.

The last of Oser's conclusions, to which I referred earlier, relates to the observation made by Müller that while the fat absorption is greatly disturbed by absence of bile from the intestine, the splitting of the fats is normal in this condition, but is much reduced in pancreatic disease. As stated by Oser, there have been few studies of this question excepting those made by Müller himself.   v. Noorden obtained results similar to Müller's in two cases of pancreatic disease.   Northrup and Herter, in the case which has previously been referred to, investigated the splitting of the fats with negative results, the fat digestion being normal; but, as they state, negative observations do not invalidate Müller's teaching.   It is quite possible that the intestinal bacteria may exercise sufficient fat-splitting action to make a negative result in such an investigation of no value.   It is also quite possible, I think, as I said before in speaking of the sulphates, that the pancreatic duct at the time of examination may have been open or only incompletely closed; pancreatic secretion may have been produced to some extent, and the secretion may have partly or wholly escaped into the intestine, thus making the result negative.

It seems probable that a negative result of this test also would not be of much value, for such a result would be subject to about the same considerations that I have suggested in speaking of the ethereal sulphates. A positive result, however, so far as our knowledge now goes, would seem to be an indication of pancreatic disease if diarrhœa were absent, for I am not aware that marked disturbance of the fat-splitting action has been observed in any case in which it was known that pancreatic disease was absent, excepting when severe intestinal disturbance was evidently present.

In the case of prolonged catarrhal jaundice in which I studied the fat absorption I also investigated the amount of fat splitting that had taken place; 78 per cent. of the large amount of fats that was present in the feces was fatty acids and soaps, only 22 per cent. being found as neutral fat.   These conditions are entirely normal, and hence the case also serves to add some weight to Müller's statement that icterus, while largely interfering with fat absorption, does not disturb the splitting of the fats.   In the case of pancreatic carcinoma a study of the digestion of the fats would have been more directly of diagnostic

interest.   Unfortunately, such a study could not be carried out, because
the stools were not preserved owing to confusion resulting from a change
of ward nurses.

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PREMATURE INFANTS.

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I HAVE selected the subject of premature infants because it has been
inadvertently neglected.   The theme is far from hackneyed ; and as I
have had unusual facilities for observing this class of patients at the
Nursery and Child's Hospital of this city, it is hoped the subject may
be of interest.   Records of forty cases are in my possession, of which
a large majority have come under my observation clinically or on the
autopsy table.

On examining a premature infant we are impressed with its general
diminutive characteristics, with which the excessively developed head
ill corresponds.   The skin is a raw, cinnamon-red, and presents
lanugo in proportion to the period of prematurity, while the lack of
subcutaneous fat gives the skin a wrinkled appearance and the face an
expression of senility.   The greater the period of prematurity the more
marked the torpor and inactivity of the child.   The limbs evince little
motion, and the occasional feeble whine contrasts strongly with the cry

of the healthful full-term infant. During the first days the eyes are constantly closed, and the child passes its time in torpid somnolence, never displaying even the wandering stare that a full-term infant shows through its half-open lids.

The nails are soft and do not reach the ends of the digits; this is even more noticeable on the toes. The wide-open fontanelles and sutures give a yielding character to the cranial vault, and the bones are so soft and pliable that the symmetry of the skull is easily destroyed by pressure. If temporary, the bones quickly resume their proper relations; but if by lying in one position, as is often the case, the weight of the head falls continuously upon one side, a marked deformity develops.

Even a full-term infant experiences a contrast during its first days of independent existence, and begins a struggle which ill suits the lazy habits acquired in utero; unceremoniously forced from its parasitic life, it is now compelled to do its own work and earn its own livelihood. During the first days of the struggle for existence many succumb to the novel conditions.

If hard upon the full-term infant, how much more difficult the effort for the prematurely born, all too soon thrust into an unsuitable environment where each undeveloped organ must be subjected to an unaccustomed strain. As if in protest, the vigorous infant sets up a howl, but the weak lungs of the premature can but feebly whine a denunciation of the entire process. Thus begins a series of respiratory gymnastics which must be independently maintained through life.

The greatest task undertaken by the premature infant is the maintenance of its body heat. In utero this is passively received from and governed by the mother, but at birth the infant passes from the uniform temperature of the amniotic fluid to the lower and variable temperature of the air. From this time the uneducated heat centre struggles to so control the manufacture and loss of heat that a normal temperature may be maintained.

The last chart (V) shows the temperature of an infant born at the twenty-ninth week. Its birth-weight was only three pounds. For nine days the temperature remained subnormal. This may have been due to a lack of vitality which did not permit of proper heat production, or, what is more likely, to an excessive heat loss. It is a well-known physiological fact that the smaller the individual the greater is the proportion of body surface exposed for radiation, and consequently premature infants are compelled from their diminutive size to manufacture a greater proportional amount of heat. Unjust as it seems, then, the smaller and more premature the infant the greater is the task imposed. It is hardly to be expected that the uneducated heat centre can be forced to that nicety of control which exists after the mature training of adult life.

In the premature infant it is especially erratic during the first days of life. The infant may maintain a high range of temperature, in which case the fuel of the body is unnecessarily consumed and the constitution weakened ; or the temperature may remain subnormal, this being an index that the vitality of the child is low and death may be impending. More frequently the temperature runs an up-and-down course, at times high and at times low, and days may elapse before the normal is

CHART I.
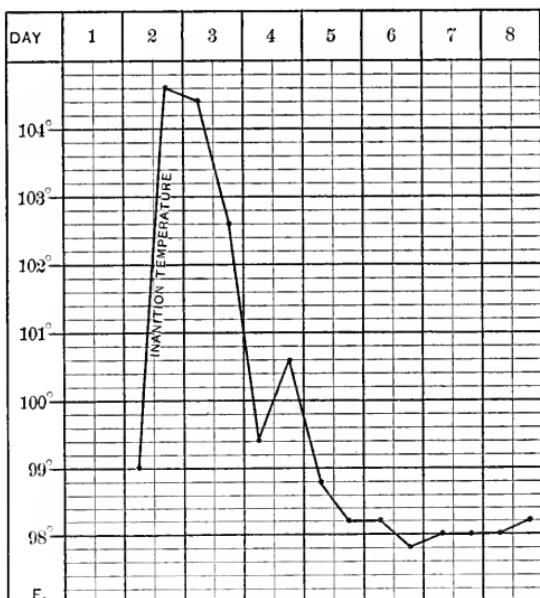
Inanition temperature. Infant born at thirty-fifth week.

CHART II.
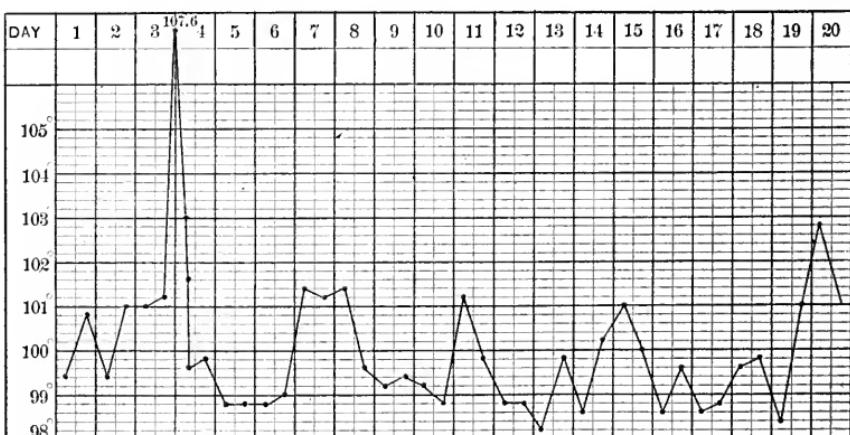
Born at thirty-fifth week. Irregularity of temperature unaccounted for except by prematurity of infant.

CHART III.
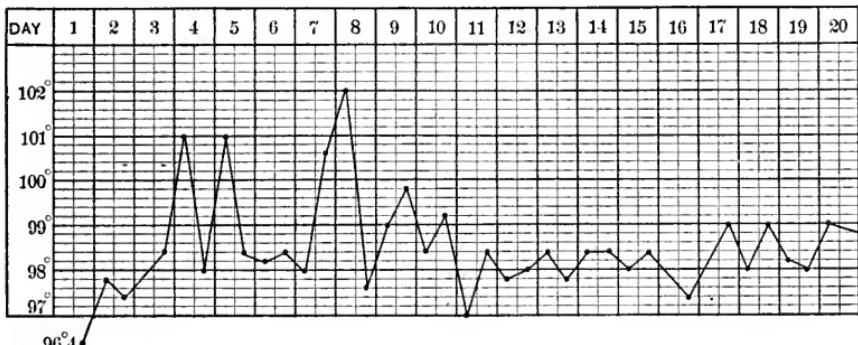
Very small premature infant. Born at thirty-fourth week. Irregularities of temperature due to prematurity and constipation.

CHART IV.
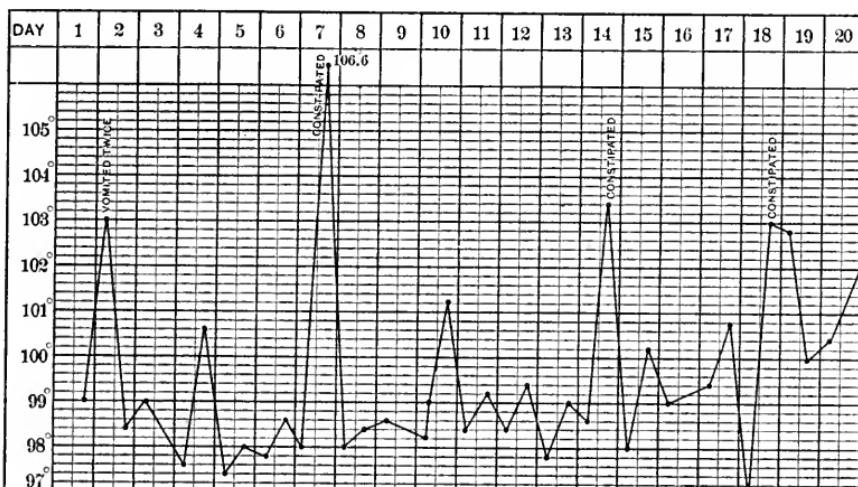
Born at thirtieth week. Temperature irregular. The smaller variations due to period of prematurity and the larger to gastro-intestinal symptoms.

CHART V.
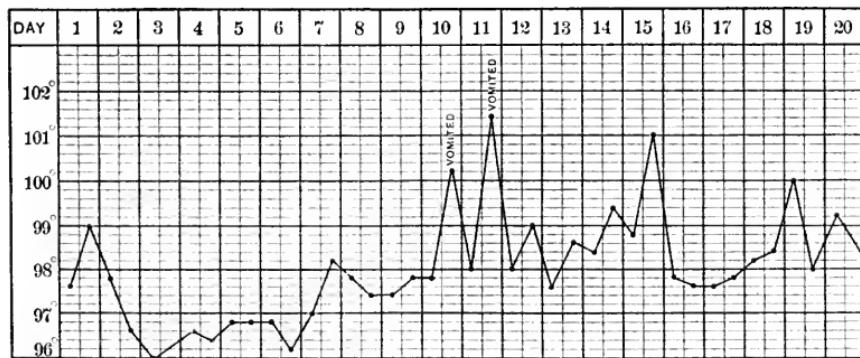
Born at twenty-ninth week. Birth weight 1480 grammes (3 pounds). Temperature subnormal till the tenth day. Had repeated attacks of cyanosis.

approximated. An irregular temperature may be considered quite the normal, and no further cause need be assigned than the prematurity of the infant.

Secondly, changes in temperature may be due to gastro-intestinal symptoms, to which these infants are particularly prone. Constipation, looseness of the bowels, and attacks of vomiting frequently cause a sharp rise in temperature. An overheated incubator may cause a miniature heat prostration, which, fortunately, needs no more active treatment than a more careful regulation of the heat supply.

In order to understand the irregularities of respiration it is necessary to study the embryology and pathology of the lung. During fœtal life no alveoli exist prior to the fourth month, and the bronchial tubes are widely separated by mesenchyma. As the lungs develop the ramifications of the tubes extend rapidly. In the prematurely born the alveoli are surrounded by an excessive amount of connective tissue and are poorly developed, so that they contrast strongly with the superabundant bronchi. The vascular structure of the lungs is composed of a rich, unsupported capillary network whose elastic walls are easily overdistended and led to encroach upon the air vesicles. The feeble respiration permits of collapse of the air vesicles and engorgement of the vessels, resulting in hypostasis and atelectasis of the posterior and dependent lobes. Autopsies upon this class of patients in the first days of life seldom reveal completely aërated lung, patches of atelectasis being seen in a greater or less degree.

The bony framework of the thorax is non-resistant and elastic, so that during forced inspiration the chest-wall sinks in. With such an ill adapted chest-wall and poorly developed lungs the gasps of the infant are disappointingly ineffective.

After it is first established the respiratory centre is unstable and the action of the lungs irregular. A respiratory rhythm resembling the Cheyne-Stokes is frequently seen. The primary respirations are apt to be delayed or so feeble as to require treatment. Even after being first stimulated to its task the respiratory centre may fail and an attack of cyanosis ensue. In adult life such a plight would automatically stimulate the respiratory centre to action, but under these conditions prompt treatment must relieve the dyspnœa, or the helpless infant may gasp in vain. One attack of cyanosis is apt to be followed by another, each becoming more urgent, until at last death ensues. This is one of the most frequent terminations of the prematurely born.

Of the 40 cases of which I have records 11 had cyanotic attacks, causing 4 deaths; while 2 others died of cyanosis and complicating symptoms. That the liability to these attacks is increased by the period of prematurity is seen by the fact that six of these cases

occurred in children born in the twenty-eighth, twenty-ninth, and thirtieth weeks, while only five are recorded thereafter. They are also peculiar to the first days of life, and in the series under consideration no deaths were caused by them after the tenth day of life.

The ductus arteriosus and foramen ovale appeared to have no part in these attacks of cyanosis, for both post-mortem and clinical evidence demonstrated a closure of these structures.

The independent maintenance of a regular temperature and respiratory action is not attempted until after birth, but the heart in utero has had preliminary education, and its action is consequently more regular than that of respiration. Still, it is not as machine-like as when experienced in its task, and occasionally falters. In fact, death may ensue from simple cardiac failure. In the records in my possession four died from no assignable cause. The machinery refused to work, and in this breakdown the heart probably played a part.

The kidneys, like the other vital organs, may balk in their duty ; often a day goes by without any urine being passed, and occasionally it is longer delayed. Uric acid is secreted in abundance, as evidenced by the frequent pink stain upon the napkins, and inspection of the kidneys reveals fan-shaped infarctions of uric acid in the pyramids.

Another frequent symptom of prematurity is a general œdema. It is difficult to say to what this is due. It may be the feeble heart, the balking kidneys, or the anæmia of the infant.

Premature infants possess at birth an excessive amount of hæmoglobin, but it appears to be loosely bound in the red corpuscle, and there is a decided tendency to the development of an anæmic state. Ofttimes we are impressed with the waxy whiteness of the occupant of the incubator ; this is simply an exaggeration of the loss of hæmoglobin which occurs during the first three weeks of a full-term infant's life. Destruction of hæmoglobin is active in both cases, but, as in other constructive processes, the organism of the premature is tardy in fulfilling its duty.

The weight of the child is the best guide we have as to its condition, and its birth-weight is an index to its vitality. The premature weigh less and gain more slowly than the full-term infants, but the slight variations in weight are all-important, and it is not until there is a steady gain that proper progress is assured, and, on the other hand, a steady loss is threatening. A normal full-term infant loses weight for three days, and then makes steady gains until the birth-weight is regained by the tenth day. In the premature the constructive processes are slower, and the average of the cases under consideration do not show the birth-weight regained until the thirty-first day. The more premature the infant the slower the process of tissue formation, and months may elapse before the Liliputian characteristics are lost.

MORTALITY ACCORDING TO PERIOD OF PREMATURITY.

Period of Prematurity.					Diseases of Prematurity (died).	Diseases of later life (died).	Discharged.	In hospital.
28 weeks	.	.	.	.	5			
29 "	.	.	.	.	...	1		
30 "	.	.	.	.	4	2		
31 "	.	.	.	.	...	1		
32 "	.	.	.	.	1	...	1	
33 "	.	.	.	.	1	...	1	
34 "	.	.	.	.	...	1	1	
35 "	.	.	.	.	...	2	5	
36 "	.	.	.	.	2	...	2	
37 "	.	.	.	.	...	4	1	3
38 "	.	.	.	.	...	...	2	
					13	11	13	3

Of the 40 cases reported 16 were discharged or are still inmates of the Nursery and Child's Hospital, while 24 died. All the children born in the twenty-eighth week succumbed in a few hours or days. One born in the twenty-ninth week was making good gains and doing nicely, when he contracted measles at nine months of age and died of a complicating pneumonia. It is unfortunate that so many cases like this terminated in death due simply to extraneous causes, and not attributable to prematurity. This fact has made an unwarranted increase in the death-rate. Of the 24 deaths 11 are attributable to the infantile diseases of later life, none of these dying until the period of full term was passed. Measles and pneumonia killed 2, pneumonia 1, while marasmus caused 7 deaths. None of these children died until after they had passed the nine months of uterine life, consequently cannot be said to have died of prematurity *per se.* Their deaths can be ascribed to the usual conditions which threaten the life of any infant in an institution; still the large death-rate from malnutrition naturally suggests a predisposition to an unbalanced nutrition. The patients did remarkably well as long as mother's milk could be obtained, but the death-rate was increased by the scarcity of the supply. This compelled the administration of a substitute feeding as soon as the critical days were past. Artificial feeding, together with the unhygienic conditions of institution life, were large factors in the death-rate.

CAUSES OF DEATH.

No evident cause	4
Hemorrhages	2
Cyanosis	4
Cyanosis and hemorrhages	1
Anæmia	1
Anæmia and catarrhal colitis	1
Anasarca and cyanosis	1
Malnutrition	7
Gastro-enteritis	1
Measles and pneumonia	2
	24

Thirteen died of the diseases peculiar to prematurity; of these, cyanosis killed four. Three deaths are recorded from cyanotic attacks during the first four days and only one as late as the tenth. Autopsies in these cases showed the condition was due to atelectasis of the lungs. Four cases died of no assignable cause. Although these cannot be safely classified as due to heart-failure, no doubt disturbance of that organ was a determining factor. Two deaths were caused by hemorrhage pure and simple. Autopsy in one of these cases showed large clots in the lateral ventricles, while in the other the hemorrhage was located in the suprarenal capsules and broke, forming a large retroperitoneal clot. One infant died of a combination of cyanosis and hemorrhages; blood was passed from the mouth, nose, vagina, and rectum.

In one case a marked anæmia appeared to be the only cause of death. A general œdema, combined with cyanosis, killed one. It is a common observation that premature infants show little resistance to infection, and·without proper precautions may die of sepsis. Fortunately, in the present series no deaths are recognized from that cause.

PROGNOSIS. The more premature the infant the more hazardous the outlook. Few infants born before the twenty-ninth week are saved. The temperature has no prognostic value.

Attacks of cyanosis are not necessarily fatal, and if the infant withstands them during the first few days the case becomes more hopeful, the attacks gradually diminishing in significance as time goes on.

Continued loss of weight is discouraging, and the sooner a steady gain in weight is recorded the better. Some time must elapse before the nutritive processes have developed a healthy body; but once well started the extra-uterine growth of the child should be healthy, although perchance tardy. A tendency toward malnutrition, however, should be guarded against.

TREATMENT. Some premature infants demand no more treatment than those born at full term, and of this class it is hardly necessary to speak. Let us rather confine our attention to those whose demands are the most exacting.

The proper treatment of the premature infant requires excessive attention to details. We are apt to consider an incubator the one and only requisite; but while it is quite necessary, it is vain to place reliance upon it to the neglect of the exacting duties of everyday life. The premature infant demands as nearly as possible the conditions experienced in utero, and every effort must be made to simulate this environment. The child in utero rests in a warm chamber, bathed, as we may say, on every side by a water bed, while the body-wall of the mother shields it from external violence. No ray of light or sound from the external world disturbs its delightful slumber. These condi-

tions we must strive to simulate artificially, and the incubator must be dark and quiet, while the temperature is carefully regulated. It is not essential to discuss the mechanics of the incubator, which are described in various text-books. It is only necessary to say that the temperature should be controlled to meet the various conditions. If the infant is very puny and in an early stage of prematurity the temperature of the incubator must be high at the onset; 95° F. is well tolerated in these cases. It is exceptional for as high temperature as this to be required for any length of time. In the ordinary case 90° F. is high enough. A temperature-chart recording a continued low range indicates that the heat-producing power of the infant must be artificially aided, while a state of fever may better be controlled if the temperature of the incubator is reduced.

Only careful watching can satisfactorily accomplish our object. Often the patient's temperature is abnormally increased by the excessive heat of the incubator, but promptly falls when this is properly regulated by the nurse.

A high temperature should be gradually reduced as the vitality and animal heat of the patient indicate, but the incubator will at least be required until the child has reached an age corresponding to full term, and in many cases longer.

During incubator life the reduction in temperature must be gradual until it corresponds to that of the open room, and the child is by degrees educated to existence outside the incubator.

It is useless to lay down arbitrary rules for the temperature of the incubator. It is only by close observation and good sense that it can be properly regulated.

If possible it would be better to forbid any disturbance of the infant whatever, but attention to the toilet demands a certain amount of handling. Fondling and unnecessary handling strain the heart and cause unaccustomed sensations, which are more deleterious than ordinarily appreciated. They should be strictly forbidden. Baths are to be prohibited for several days, and if the buttocks are soiled the necessary cleansing can be accomplished with a bit of moist absorbent cotton. Even the napkin is easily dispensed with and its place taken by a bit of soft cotton, which absorbs the urine and receives the feces. This can be replaced without disturbing the infant.

The simpler the clothing and the fewer the pins and fastenings the better. Our ideal is well realized in a shirt which opens down the entire front and is long enough to completely cover the feet. This should be made of an inexpensive material, so that it can be destroyed when soiled, and should be so soft that it will not irritate the sensitive skin. No material suits the purpose better than cotton sewed between two layers of fine cheese-cloth. Wrapped in this, the infant should repose on the

softest possible couch, and only be disturbed for feedings or changes in the toilet.

Without daily weighing it is difficult to judge of the infant's progress, but in most cases it had better be dispensed with and the observer content himself with a record of the weight at infrequent intervals.

The attacks of cyanosis are serious, and each attack should be promptly treated by the administration of oxygen and minim doses of whiskey. This symptom frequently appears after taking food, and if any of the milk has found its way into the larynx and trachea it should be promptly removed by inversion of the infant and by patting the back. Distention of the stomach, by pressure on the lung tissue, may cause cyanosis; distention of the bowels may also embarrass respiration. In fact, the intestines demand the closest attention, as their action is sluggish. The entire muscular system, whether voluntary or involuntary, is poorly developed, allowing of nothing but feeble movements and apparent torpor. The muscle of the intestines permits of a stagnation of the feces, which must be urged onward by small doses of castor oil. Attention to this apparently insignificant function may keep the vitality of the infant from danger. The abdominal wall is non-resistant, so that herniæ easily force their way through in a goodly number of cases, giving conspicuous evidence of a lack of muscular tone.

The stomach of the premature is very small, and whereas a full-term infant's stomach has a capacity of an ounce, the premature must be fed in fractions of that amount. The smallest of this class of patients take but a drachm at a feeding, while the more robust can take two or three drachms or more at the beginning.

Although but small amounts are tolerated, the fuel should be frequently administered to maintain the body heat. The intervals of feeding should be hourly at first, and gradually increased by a quarter of an hour at a time until the quantity and frequency of the feeding approach that indicated in a full-term child.

The torpor and weakness of the premature during the first days of life often prevent the instinct of nursing. In such a case the infant must be fed. The milk is best offered in a medicine dropper, a few drops at a time; it readily runs back into the fauces and is swallowed. As the constitution becomes stronger the infant can be taught to nurse from the bottle, and later it can be taken from the incubator or put to the breast.

Gavage, highly recommended by some authorities, appears to disturb the infant too much, and it has not been found necessary in the cases reported. Certainly it should be avoided if simpler means are adequate.

The importance of proper feeding in cases of prematurity cannot be too strongly accentuated, more deaths resulting from ignorance of this subject than any other one item. In the first place, the gastro-intestinal

tract is so poorly developed that fats and proteids are feebly digested. If a modified milk is administered it must be weak, not containing more than 1 per cent. of fat and 50 per cent. of proteids, until the alimentary tract is educated to its task. Modified milk is warmly recommended by Rotch, of Boston, but our experience indicates that it should not be used when proper breast milk is obtainable.

Mother's milk is the ideal food, and every premature infant should have it if its variations and management are properly understood. In order to explain the subject attention is called to the analyses made by my brother, John S. Adriance, Ph.D. In co-operation with him the author published in the *Archives af Pediatrics* of February and March, 1897, an extended article on the chemistry of human milk. It was demonstrated that there are peculiarities during certain periods of lactation. During the first few days, when the breasts are assuming their activity, there are irregularities which do not occur when the function is established. Normal colostrum—that is, milk during the first few days after a full-term labor—shows a wide variation in the amount of fat. The sugar is low at first, but increases rapidly, and by the end of the first two weeks has made a marked increase. The proteids pursue just the opposite course, being higher on the second day than at any other time during lactation, but falling rapidly during the first few days, and less rapidly thereafter.

This excess of proteids in colostrum milk is due to the sudden assumption of the mammary function. The breasts are unexpectedly engorged with an increased blood-supply and the mammary cells forced to activity. It is no marvel that during this strain the secreting cells permit of a serous transudation and that an excess of albumin is found in the secretion.

The milk offered by the breasts during the first days after a prema - ture labor is colostrum milk and has its characteristics, but to an exaggerated degree. The marked increase in the amount of proteids is especially noticeable. The excess persists longer, and it is not easily dispelled. It has even been found persisting as high as 2 per cent. in the second month.

ANALYSIS OF PREMATURE MILK AT SUCCESSIVE TIMES.

	4 *days.*	17 *days.*	1 *mo.* 10 *days.*
Fat	3.39	3.32	3.33
Carbohydrates	5.02	4.43	6.64
Proteids	4.90	3.88	1.71
Salts	0.31	0.26	0.10
Total solids	13.66	11.91	11.79
Water	86.32	88.08	88.20

These analyses demonstrate an excessively high percentage of proteids, accompanied by a correspondingly high percentage of salts. They

decrease together as lactation progresses. The amount of carbohydrates is lower than in any other series of milk analyzed. The last two factors hardly require attention, but the excessive proteids should be recognized.

The management of this condition is difficult ; while ordinary colostrum milk soon adjusts itself, the milk of prematurity persistently maintains a high percentage of proteids. It may be reduced by administering large quantities of water to the mother or by pumping the milk and diluting with milk-sugar solution.   Exercise, upon which we ordinarily rely for diminishing the proteids, is out of the question during the period of childbed.

Even if our efforts were successful the milk presents different characteristics from that later in lactation, and cannot be administered in safety.   Many premature infants could be saved if this were generally known and the gastro-intestinal functions guarded with the care they demand.   Attacks of vomiting and looseness of the bowels, with curdy movements, may seem trifling, but they are unwarranted in these delicate patients, especially when it is realized that a toxic gastro-enteritis with high temperature and fatal issue may ensue.

In cases of prematurity, then, the mother's milk should not be offered, but a wet-nurse secured.   Her infant must be healthy, full term, two weeks of age (and, better, a month), in order that the characters of the colostrum period may be lost, and nothing will better determine the quality of her milk than its chemical examination.

The mother's breasts in the meantime should be pumped and massaged, so that they will not dry up, but after the proper change in function will offer the proper food. The change from wet-nurse to mother, however, must be gradually and carefully managed.

To summarize feeding in this condition, our indication is to administer a weak, digestible food, guarding against overtaxing the stomach and intestines.   These organs must be protected, even if temporarily the nutrition of the infant appears to suffer, their future education being relied upon to take care of a stronger diet.

A CONTRIBUTION TO THE STUDY OF FATTY INFILTRATION OF THE HEART SECONDARY TO "SUBPERICARDIAL OVER–FATNESS."

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IN this paper it is intended to consider, principally, questions relating to fatty infiltration of the heart as met with in extreme obesity. I desire also to note briefly the more distinctive symptoms of pure fatty overgrowth (fat around the heart).   This will, it is hoped, assist in the dis-

crimination of the cases in which fatty infiltration is superadded. A certain small proportion of the cases of fatty infiltration are associated with graver forms of myocardial degeneration, principally fibroid and fatty. As the result of considerable personal experience with cases of fatty overgrowth and fatty infiltration the belief that fatty degeneration is a rare sequel of the latter condition is amply confirmed. The view that " fatty deposits in and around the heart often cannot be distinguished from fatty degeneration,"[1] however, is incontrovertible. Conversely, I have met instances that presented undoubted evidences of " subpericardial over-fatness " combined with features that aroused suspicion of fatty infiltration and degeneration, in which, after the over-fatness was removed, the heart-sounds became of normal strength and clearness, the features pointing to myocardial involvement disappearing.

According to E. Leyden,[2] the cases of " fat-heart " are divisible into two subclasses : (a) fatty overgrowth and (b) fatty infiltration. By the former term is meant an excessive deposit upon and around the heart in the subpericardial space ; the latter (fatty infiltration) refers to an infiltration or a dipping of fat between the muscle-fibres even to the endocardium. While accepting this general classification, which is both convenient and expressive from a clinical stand-point, I would suggest for the first subclass the term " subpericardial over-fatness," since all cases present clear evidences of general over-fatness, rarely of partial over-fatness, and there is slight, if any, implication of the myocardium in most instances. On the other hand, the form of fatty infiltration under consideration is clearly a rare condition, if we accept the not uncommon instances hinted at above in which the morbid process is limited to a thin layer of muscle-fibres situated directly beneath the epicardium, and one met in extreme obesity, as a rule. When the infiltration is confined to the superficial muscular bundles it is more than doubtful if the characteristic symptoms of fatty infiltration arise. Clinically, it is important to make a clear subdivision of " fat-heart " into two classes : the one, a large class, easy of recognition, in which there is an abnormally large deposit of fat beneath the epicardium ; the other, a small group, not easily recognized, in which interfibrillar fat deposits occur, and of graver significance. It is with the view to the adoption of a term that is more nearly distinctive of the condition, both as to the position as well as the significance of the fat-deposit, that I venture to suggest " subpericardial over-fatness " to indicate the more common and less serious form of " fat-heart."

Fatty overgrowth was described by a few of the earlier writers,

[1] Schott. British Medical Journal, August 18, 1894.
[2] Berlin. klin. Wochenschrift, April 22, 1878.

among them Kirkringius and Bonet.[1] Nothing of importance, how-
ever, was added to our accurate knowledge of the subject prior to the
middle of the present century.   Moreover, it has attracted a remark-
ably small share of attention since that epoch-making period in myo-
cardial affections.[2]   Mere obesity (subpericardial fatness) does not imply
fatty infiltration ; but it may in a mechanical manner produce respira-
tory and circulatory disturbances, particularly venous stasis, as shown
by cyanosis, a frequent, small pulse and dyspnœa, or a distinctly
asthmatic form of breathing and sometimes cough.   These symptoms
are commonly provoked by undue muscular exercise, which readily
induces heart-strain and embarrassment of the respirations in the
obese.   From the continuation of the operation of such influences, as
in certain occupations, venous stasis may lead to so-called passive
catarrh of the mucous membranes.   Certain bronchial and gastric
phenomenon with which we are acquainted now ensue.   In subperi-
cardial over-fatness the heart's weight and labor are obviously increased.
The poisonous products of tissue-metabolism are not eliminated in the
normal ratio.   Indeed, in one of my cases, a female, aged forty-two
years, presenting marked obesity, weight 225 pounds, the daily renal
output was diminished one-half from the normal health standard.
The amount of food ingested even under these circumstances was plus,
and the case exhibited all of the typical phenomena of lithæmia, of
which the obesity was probably the cause.   Doubtless the degeneration
(fatty) of the myocardium that is sometimes witnessed in long-standing
cases is secondary to the changes that often occur in the vascular
system (arterio-sclerosis).   It is conceivable also that, owing to the
mechanical obstruction to the cardiac movements in consequence of
the presence of a copious deposit of fat in the mediastinum and beneath
the epicardium, the heart action may be totally and suddenly arrested
as the result of violent exertion.

Morgagni[3] narrates a case of a corpulent man, aged fifty-eight years,
who had been suffering three years prior to death from attacks of
angina pectoris.   The autopsy revealed a large deposit of fat in the
mediastinum and subpericardial areas.   The heart was of normal size
and apparently quite sound.   He expressed the opinion that the cause
of death was the enormous fat deposit which obstructed the current of
blood in the heart and lungs.   No mention, however, is made of the
condition of the coronary vessels.

In two cases of subpericardial over-fatness, one reported by R. G.
Hebb and the other by Hingston Fox, sudden death occurred.   One

of these patients fell dead while running to catch a " bus; " the other, five minutes after being anæsthetized. In both instances, however, rupture of the left ventricle was noted at autopsy. Hingston Fox's case, " from staining reactions of the muscle-fibres and their stria- tions," showed no indication of either fatty degeneration or fatty infil- tration of the heart-wall. In Hebb's case " fatty degeneration was absent." Such facts as these go to show that subpericardial over-fat- ness, looked upon usually as being free from immediate danger to life, may possess considerable medico-legal importance. Among the inevit- able secondary effects occasioned by this interference of general fatty overgrowth with the heart mechanism and lung expansion are certain nutritive disturbances, the extent of which it is impossible to estimate with any degree of accuracy. Ordinarily, while at rest, the pulse is regular and moderately strong, although hard to reach in some cases. In the plethoric form of obesity, notwithstanding the presence of greatly thickened chest-walls, the great strength of the cardiac systole is often surprising, while the pulse is full and regular. On the other hand, particularly in the anæmic variety of obesity, it may be small, less tense (compressible), and slightly increased in frequency, but, as a rule, regular. A moderate grade of cardiac hypertrophy due to an increased demand upon the contractile energy of the heart is some- times observed, but in many instances it is not found present. Says Kennedy,[1] *cardiac hypertrophy* (italics mine) " is not to be wondered at, for it would be strange indeed if, with an addition of from three to six ounces of fat placed on the organ, it would continue to carry on the same degree of action as in the normal state." It is often impossible to determine the size of the organ during life, owing to the overlying fat deposit. Enlargement is more common, for obvious reasons, in cases in which dilatation ensues in consequence of fatty infiltration. Not a few of the subjects of subpericardial over-fatness lead active, useful, and energetic lives.

It is impossible in the present state of knowledge to establish precisely the relation of this condition to fatty infiltration and myocardial degen- eration, either fibroid or fatty. There is probably little convincing evidence to support the current view that subpericardial over-fatness is commonly, or even in any considerable percentage of cases, followed by fatty infiltration. According to my observation, without exception fatty infiltration was secondary to the pronounced form of anæmic obesity. Out of 103 cases, lasting for periods ranging from a few to many years, of extreme polysarcia that have occurred in my experience only five cases gave convincing proof of the existence of fatty infiltra- tion. It has been reported, though rarely, in moderately corpulent

[1] Observations on Fatty Heart; Essay, 1880.

persons; but in such the symptoms are probably dependent upon a true fatty change due to causes other than fatty infiltration. It is in these cases that the renal output is markedly deficient. Again, the question how long subpericardial over-fatness continues as such before it terminates in fatty infiltration, in cases in which this sequel occurs, is unknown; but the usual period must, from personal knowledge, be measured by decades and not by years.

Rarely, however, we meet with exceptions to the rule. The clinical indications of fatty infiltration then appear early, and an alarming condition may soon be presented. The advisability and even the clinical importance of clearly differentiating mediastinal and extra-cardiac conditions from those that distinctly impair its contractile power, as, for example, fatty infiltration, must be obvious. In most instances, at least, the process of fatty infiltration reaches its highest development in the right ventricle, which in marked polysarcia may be completely covered by the deposit of fat, the left being rarely completely enveloped. The interfibrillar depositions are most marked near the surface of the organ. Fat infiltration exerts pressure upon and between the muscular fasciculi, inducing " atrophy and replacement " and embarrassing the action of the heart. This form of atrophy is secondary to and dependent upon the infiltration; but " some cases of primary atrophy of the muscle lead to the secondary development of fat in the connective tissue which is everywhere present and potentially fat-bearing."[1]

A similar mode of origin of fatty infiltration is also exemplified in cases of pericarditis followed by adhesion of the visceral and parietal surfaces of the pericardium. It is conceivable that, as the result of mechanical compression by fat, the lumen of the coronary vessels is narrowed, with consequential defective nutritive supply to the muscle cells. Under these circumstances fatty metamorphosis or degeneration is the result, but this is probably an exceptional sequel.

In the cachexias of carcinoma and phthisis, as well as in the general senile atrophy, a moderate degree of subpericardial over-fatness, fatty infiltration, and true fatty change may all be found in association. In such instances the fatty infiltration may be, in part at least, secondary to atrophy of the muscle cells (part of a general atrophic process), and not the cause of the metamorphosis. At all events it may be assumed that it is only in the extreme grades of fatty infiltration that muscular atrophy from compression by infiltrated fat (" pressure atrophy ") ensues.

I shall deal only with cases of fatty infiltration that are the consequence of extreme obesity combined with subpericardial over-fatness.

[1] R. Douglass Powell. Allbutt's System, vol. vi., 893, 894.

The etiology is obviously that of extreme general obesity, particularly the anæmic variety, however the latter may be produced. As a clinical entity, fatty infiltration is not sharply defined, and writers are not in perfect agreement as to the grouping of features on which to base even a reasonably assured diagnosis. Two conditions are among constant accompaniments, marked polysarcia and a feeble heart. It may be pointed out that in the majority of cases it is not until the symptoms of commencing dilatation, often as the result of sudden or unusual muscular exercise or a profound shock, develop that we are warranted in entertaining the belief that fatty infiltration has supervened. The more characteristic clinical indications are urgent dyspnœa upon muscular exercise, præcordial discomfort, pain under the sternum, angina pectoris, cardiac palpitation, arrhythmia, syncope, vertigo, and cyanosis. Various forms and grades of intensity of cardiac arrhythmia are commonly present.

Slight irregularities in which the pulse-waves occasionally vary in size and tension, or an occasional intermittence followed by a brief pause, are not indicative of fatty infiltration; at all events, they are not unfavorable symptoms. I have repeatedly observed slight intermittence and arrhythmia disappear as the result of treatment directed to the over-fatness. On the other hand, marked and constant disturbance of the cardiac rhythm is symptomatic of fatty infiltration and irremovable, although marked improvement may follow an appropriate course of treatment. Kisch[1] pertinently remarks: "Complete irregularity, *delirium cordis*, is to be regarded as a sign of grave disturbance of the heart mechanism which can never be removed, and is sometimes premonitory of sudden death." Cardiac arrhythmia is not, however, peculiar to fatty infiltration. Moreover, there are latent instances in which the pulse is full and strong and not increased in frequency. In a strongly suspicious case under my care at present the pulse is large, regular, and of high tension. With the appearance of ensuing cardiac dilatation the pulse-tension falls and the frequency of the heart's action increases. Irregularity also supervenes. Thus the transition of the disease from the earlier to the later stages may be noted, and these changes that occur in the development of the disease may serve to explain the differences of opinion among clinical observers as to the rate and other peculiarities of the pulse.

Henry Kennedy[2] bases his diagnosis upon a large, full pulse, not increased in frequency, an enlarged area of heart dulness; possibly a soft, systolic murmur over the base.

Bronchial asthma or an asthmatic type of breathing after a full meal, or in the absence of any exciting cause, is frequently observed in fatty

[1] Berliner klinische Wochenschrift, March 18, 1895.   [2] Loc. cit.

infiltration. A passive (hydrostatic) bronchitis, with cough and expectoration, is superadded in most cases. Angina pectoris is a recognized symptom. From personal experience, the apprehension of arterial disease, particularly sclerosis of the coronaries, is warranted in the majority of the cases that exhibit angina pectoris. Again, in the tabulated list of cases appended below arterio-sclerosis was present in two of the three fatal instances, but no particular mention of the condition of the coronary arteries was made in the autopsy notes. It may be pointed out here that in none of my cases was aortic regurgitation or adherent pericardium (so far as could be determined) in association, but in two of the five cases reported there were evidences of arteriosclerosis. In Case I., in which severe attacks of angina still occur, the vasomotor apparatus is greatly disturbed during the seizures. I have had an opportunity to examine this case immediately after the paroxysm. So soon as the pain is over gaseous eructations occur; the heart's action, which is at all times markedly irregular, is unchanged, although the pulse at the wrist becomes almost imperceptible for a short period and dyspnœa is also temporarily aggravated.

The above symptom-group includes the most characteristic features, while other and more unusual manifestations are pointed out in the notes of the subjoined cases. The more or less characteristic features of fatty infiltration may become characterized suddenly, contrary to the general rule, in the course of subpericardial over-fatness which has lasted for a long period of time. Again, the turning-point in such instances may take place at a comparatively early period of life, as mentioned above, and the approximate cause may be a single systemic shock (as childbirth) or repeated shocks, such as occurred recently in a case under my immediate observation.

The notes follow:

Case I.—Mrs. W. H. S., aged forty years, came under observation September 9, 1900. Menstruation had been regular, although somewhat scanty. The patient had always been stout, and now weighs 220 pounds; height, 5 feet 8 inches. Two children born, the second one when patient was thirty-eight years of age. The father died of Bright's disease and one brother of phthisis; otherwise, family history was uneventful. The patient had enjoyed good health until four years previously, when she had a severe attack of influenza. One year later sustained a severe shock through death of a brother, and after the lapse of another year a second shock due to the prolonged second childbirth, which was attended with much hemorrhage. Following up this event exhaustion was extreme and life despaired of; but she slowly recovered, although remaining in a highly nervous condition, with marked arrhythmia and dyspnœa on slight exertion. The death of her child, at ten months of age, plunged her into profound grief, aggravating at the same time the symptoms mentioned before. Four months later I was called. Patient now suffering from cough, asth-

matic breathing, and *delirium cordis;* the pulse small, soft, compressible, and too irregular and intermittent to be recorded at the wrist. The skin surface was pale; no cardiac impulse visible; the heart could not be satisfactorily outlined by percussion, although some degree of enlargement was evident; palpation detected an exceedingly feeble, irregular, and at times intermittent impulse.   On auscultation no murmur could be heard, but sibilant râles over the bronchi; a low-toned, wheezing sound on expiration was audible.   The urine contained a trace of albumin, and the acidity was slightly increased. Patient extremely nervous and often weeps while in ordinary conversation; slight twitching of the muscles of the face observed almost constantly; has headaches at frequent intervals.   May not some of these nervous symptoms be ascribed to uræmic intoxication? is a pertinent question.   I may add that similar nervous symptoms, although less marked in two, were also observed in all of the remaining cases herein recorded.   This patient has been troubled with cough and a mucoid expectoration after having lain in bed for a few hours at perfect rest. The cause of these symptoms is probably a hydrostatic bronchitis due to increased feebleness of the action of the heart while the patient is at absolute rest.

The patient has had occasional anginoid attacks during the past four months, and more recently has complained almost constantly of pain behind the lower portion of the sternum; exacerbations of præcordial pains also occur, during which she cannot lie down; has great trouble in breathing; awful forebodings; is restless, and the skin grows pale and moist.   Stimulants afford relief at times, but the worst attacks demand morphine hypodermatically.

Present Condition (November 29, 1900).   The attacks of anginiform pains are improving and the heart's action is somewhat more regular and slightly stronger.

December 18*th.*   Has had fresh exacerbations as the result of over-exertion and severe angina.

There came under my notice recently a case in which the opinion that fatty change in the heart fibres was associated with extreme fatty overgrowth had been long entertained.   The notes of Case II. are as follows:

CASE II.—Mrs. J. B., aged fifty years, of temperate habits; has seven children; is still menstruating regularly, although the flow has long since been somewhat scanty.   The father and one sister are moderately obese; mother died of phthisis and a sister suffered in early life from acute rheumatism.   The patient has had the usual childish affections, and two years previous to consulting me had an attack of influenza.   Patient had become progressively stouter from the time she began to bear children up to the date of my first visit to her, at which time the bodily weight was 310¼ pounds.   Previous to her marriage had been moderately fleshy.   For ten years there had been marked dyspnœa and palpitation on exertion, and when I first saw her locomotion was wellnigh impossible, efforts at walking being quickly followed by extreme dyspnœa, cyanosis, and by a feeling of utter exhaustion.   Attacks of cardiac asthma rarely occurred, but there were no anginiform pains.

Physical examination revealed a body of enormous proportions. The impulse was feeble and diffuse to palpation. The first sound of the heart was scarcely audible and its action was both intermittent and irregular; no murmurs were present. The limits of cardiac dulness could not be made out satisfactorily, although the left boundary line was found to approach the anterior axillary line, while slight abnormal extension to the right was noted. The pulse was small, compressible, and at times intermittent (like the cardiac action). As the result of an appropriate regimen, including massage until physical exercise could be adopted, the bodily weight was reduced to 185 pounds. At this time, fourteen months after the commencement of the treatment, the patient could readily walk four miles daily, and the heart-sounds were clear and almost regular. The enlargement of the left ventricle was now slight, and the diminution in the apparent size of the heart was due largely to the removal of the subpericardial layer of fat.

It may be questioned whether this case should be classified as one of fatty infiltration in view of the favorable issue that resulted from treatment and a proper regimen. It may, however, be admitted that slight and even moderately extensive fatty infiltration is rarely curable. On the other hand, the outcome thoroughly disproves the existence of fatty change in the muscle-fibres of the myocardium, or fatty degeneration, for when once this grave disease is established it progresses to a fatal ending.

CASE III.—A. P. B., aged forty-seven years; occupation, clerk; married; consulted me May 22, 1896. Patient hereditarily predisposed to insanity and phthisis. As a young man, was perfectly healthy until the age of twenty-two years, when he began to suffer from muscular rheumatism, and on two occasions since then has had lumbago. One year prior to consulting me had sciatica, confining him to the house for two days only. Had been growing stouter in a slow and insidious manner for fifteen years; this is attributable to the habitual use of malt and spirituous liquors coupled with the lack of muscular exercise. Present weight, 210 pounds; height, 5 feet 6 inches; user of tobacco in excess. Two years previous to his first visit he began to experience peculiar sensations and discomfort in the præcordia, sometimes inducing a sense of impending death. Muscular exertion was followed immediately by moderate dyspnœa and by pain in the præcordial region, which became worse if exercise was continued, and finally he would be compelled to desist. For at least ten years has had slight winter cough and distinctly asthmatic breathing at intervals. Dyspnœa, cough, and cyanosis have been for a long time, and still are, conspicuous features.

Physical Signs. Inspection reveals corpulent frame, abdomen unusually prominent and pendent, lung expansion somewhat restricted, and the apex-beat of the heart invisible. To palpation the tactile fremitus was normal and the cardiac impulse quite feeble and irregular; the pulse-waves were small, decidedly irregular, and slightly increased in frequency; percussion shows moderate enlargement of the heart, more especially toward the left; auscultation reveals a few dry râles over

larger bronchi; sibilant and subcrepitant râles over bases posteriorly; the heart-sounds are feeble and irregular; there are no cardiac murmurs, but the aortic second sound is slightly accentuated.

The treatment embraced the withdrawal of all the alcoholic stimulants and decided restriction in the use of cigars. Methodical and persistent exercise, including light gymnastics, was enjoined, commencing with a minimum amount and gradually increasing to three and finally to four miles daily. The regimen also included a dietary calculated to overcome the obesity. Improvement in the local manifestations was soon noted, the bodily vigor and endurance were greatly increased, and the bodily weight reduced to 185 pounds. Three years later, on July 29, 1899, the following note was made: Patient still suffers occasionally from slight attacks of angina and from anginoid pains in the intervals. The pains are aggravated by undue exertion, marked nervous disturbance, or acute indigestion. The heart's action is markedly improved inconsequence of treatment, although still irregular and rarely intermittent.

The history of rheumatism in the family as well as in the patient during early life at first gave rise to the thought that the moderate grade of arterio-sclerosis might be of rheumatic origin. The happy effects of treatment upon the arrhythmia, anginiform pains, and the general condition of the patient, however, contradicted this view and emphasized the etiological importance of the habitual use of alcohol and excessive smoking in the case. The action of alcohol in the production of obesity is well known, and the same is true of its causative influence in arterio-sclerosis. It is quite probable, at all events, that the discontinuance of these toxic substances, particularly the alcoholics, had most to do with the rapid and favorable modification of the local and general condition of the patient.

Case IV.—J. V., aged fifty-two years, American by birth, public official, consulted me on July 10, 1900. Patient weighed 225 pounds, five feet seven inches tall, and his habits were nocturnal. Has been an excessive smoker for many years. There is a clear history of rheumatism and gout in maternal ancestry. The personal history furnishes no points of value up to ten years ago, when he began to grow stout, probably in consequence of a change from an active to a sedentary, irregular life combined with a rather free use of alcoholic intoxicants. No acute illness, although dyspnœic on exertion and asthmatic at intervals, with occasional vertigo, until the onset of the complaint for which he applied for treatment. The exciting cause of the latter was probably heat-exhaustion and the improper use of cold water and ice during its treatment. Dyspnœa quickly ensued, accompanied by marked cyanosis and severe anginoid pains in the region of the heart, radiating to the neck and arms, particularly the left. The heart's action became wholly irregular, both in time and volume, and the accessible arteries were somewhat hardened; vertigo and syncope were also prominent features. The physical examination revealed a soft, low-pitched, systolic murmur near the base, with increased loudness of the aortic and pulmonary artery second sound. Dilatation of the ventricles could not be shown

by percussion, owing to the over-fatness. Although a marked improvement resulted from the treatment, which was conducted on lines similar to those in Case III., the symptoms have continued in a milder form.

The predisposing causes in this and the previous case were almost identical. The urgent symptoms (angina, *delirium cordis*, etc.) were ascribable to the acute development of heat-exhaustion, or, since they did not supervene until after the wrong use of hydrotherapy, they may have been excited by it. This is a second instance in which the evidences of infiltration following overgrowth were developed acutely. (See Case I.) These cases go to show that fatty infiltration may be latent, up to a given point at least.

CASE V.—A. B. M., aged thirty-six years; no occupation, single, weight 237 pounds (in bath); first applied for treatment February 1, 1899. Is a habitual drinker of intoxicants and particularly "spirits." The mother is rheumatic and there is a family predisposition to obesity. After suffering from childish diseases patient sustained a fall at the age of twelve years; this caused concussion of the brain, confining him to bed for three months. Patient has been stout from the time of his earliest recollection, but in recent years has suffered from vertigo and occasionally syncope, dyspnœa, præcordial discomfort, and anginoid pains, particularly on muscular exercise. The palpable arteries are not hardened; the pulse is soft. On auscultating the heart an intermittence which occurred every third or fourth beat and an occasional false intermittence were noted. Slight cardiac enlargement was elicited by percussion. A faint systolic murmur was heard at the base, though not constantly. At intervals *delirium cordis* was observed. The rhythm was less intermittent and less irregular by far in the standing posture than in the sitting or the recumbent posture. True angina pectoris has not developed. Appropriate treatment for the obesity and the use of cardiac stimulants resulted in a loss of weight amounting to thirty-one pounds and an improvement in the more conspicuous features, particularly the arrhythmia, dyspnœa, and cyanosis. Patient has not been under observation during the past year, although still living.

The cases briefly reported above show pretty clearly that the transition from subpericardial over-fatness to fatty infiltration may be, so far as the symptomatic indications go, abrupt, on the one hand, and too insidious to fix the date of onset of the latter complaint, on the other hand. In reviewing my cases it is seen that the most conspicuous symptoms were marked dyspnœa, syncope, and utter exhaustion on muscular exercise, with cyanosis, præcordial distress, anginiform pains at frequent intervals, and less commonly true angina, well-marked arrhythmia, and even *delirium cordis;* also asthmatic breathing and certain nervous phenomena, particularly emotional disturbance and mental apprehension. A basal systolic murmur was present in two cases and cardiac enlargement was detectable in four. The urine con-

tained a trace of albumin in one (Case I.).   In cases in which a murmur over the aortic area was present vertigo and syncope were annoying symptoms.   It may be stated here that a basic systolic murmur is also rarely heard in cases of subpericardial over-fatness combined with vigorous cardiac contractions.

With reference to the question of diagnosis in this complaint it must be observed that neither the subjective symptoms nor the objective signs alone or in combination are conclusive, and partly for the reason that they vary considerably in different cases.   The presence of the causative condition, extreme pericardial over-fatness, is all-important, and at once gives strength of probability to a diagnosis as one after another of the more characteristic features recited above put in an appearance. An assured recognition of the disease is finally arrived at only after the closest scrutiny of all the symptoms and physical signs coupled with a judicious balancing of the data entering into the previous history of the patient.   Should any of the primary affections, other than extreme obesity, that are liable to lead to fatty infiltration be present, this fact would clearly bear upon the case, and the diagnosis of the special form of fatty infiltration under consideration would be precluded.   Mere feebleness of the heart is not of great diagnostic value, taken alone. We see this in a variety of conditions and diseases. .I desire also to reiterate the fact that slight arrhythmia is not of any value for diagnosis in fatty infiltration.

I have appended a tabulated list of cases of fatty infiltration (unassociated with degeneration of the heart).   J. Daland,[1] J. H. Crocker[2] and others have also reported cases, but inasmuch as in all of them fatty degeneration was combined with fatty infiltration they are not included in my table.

[1] Transactions of the Pathological Society of Philadelphia, 1893 and 1894, p. 92.
[2] London Lancet, January 4, 1890.

No.	Name of reporter.	Age and Sex.	Weight.	Symptoms.	Arteriosclerosis.	Mode of death.	Condition of heart.	Remarks.
1	Satterthwaite[1]	M. 76	357 lbs.	Marked dyspnœa; pulse feeble and intermittent; impulse of heart feeble.	Slight, secondary to nephritis.	......	......	Lost 40 lbs.; marked improvement.
2	Satterthwaite	F. 65	181 lbs.	Color dusky, skin bathed in perspiration; pulse 100 to 104; weak impulse at apex; heart enlarged; no murmur.	......	......	......	Lost 10 lbs.; felt much improved.
3	Satterthwaite	M. ..	237 lbs.	Lithæmic; subject to giddiness of head, acute gaseous dyspepsia, and dyspnœa; pulse 100; no intermission; apex-beat feeble, difficult to locate; heart enlarged.	......	......	......	Lost 20 lbs. In two months. General condition much better.
4	W. H. Thayer[2]	M. 64	Compactly built; weight not given.	Previous history was negative. Patient taken ill with weak heart and indigestion. On third day pseudo-apoplectic attacks developed; dyspnœa marked until five days prior to his death; urine normal; no cardiac signs; temperature slightly elevated before death; pulse 100; setting patient up, pulse became irregular.	......	Rather sudden.	Microscopical examination of a portion of the wall of the left ventricle revealed much interstitial fat but no fatty degeneration; fat deposits and pericarditis were noted and the heart was dilated.	Lungs congested, also peritonitis.
5	David Hunter[3]	F. 77	Quite obese; weight not stated.	Had suffered from chronic malaria and secondary dementia; was confined to her bed for a few weeks (five years prior to death) with pyæmia, swelling of one knee and leg, and dyspnœa; cardiac action feeble for the last two years; was subject to swelling of feet and ankles and cyanosis, but no cardiac bruit detected; after three or four sleepless nights had dyspnœa and unusually cyanosed. She died five days afterward.	Some (chronic interstitial nephritis).	Died rather suddenly (rupture of heart).	Right ventricle ruptured, due to fatty overgrowth, with great general obesity, senility, and adherent pericardium.	
6	R. G. Hebbs[4]	F. 52	Body adipose; weight not given.	Patient was anæsthetized after a careful examination with negative results was made; five minutes after anæsthetization had ceased patient became cyanotic and died after all means of resuscitation had failed.	Present.	Sudden.	General fatty infiltration of ventricle walls. (Autopsy.)	A typical case of fat-heart.
7	O. Clemow[5]	M. 50	239 lbs.	Patient had led an active life for several years and used malt liquors to excess. When first seen patient complained of dyspnœa and difficulty in walking. Apex-beat barely palpable, normal in position; right border extended about an inch to right of sternum; first sound muffled and indistinct at apex; no murmur anywhere; pulse 72, feeble.	......	......	As result of treatment patient appeared lean, "with heart freed from the superabundant deposit upon its surface and between its fibres."	Lungs healthy; patient became ill with hepatic congestion and lost weight; when he recovered Oertel's dietary was instituted, with marked amelioration of the symptoms.

1 Post-Graduate, New York, March, 1899. 2 Brooklyn Med. Journ., February, 1890. 3 London Lancet, December 18, 1897.
4 Trans. Path. Soc. of London, vol. xlix. p. 33. 5 Med. Press and Circular, April 29, 1891.

REMARKS. Obviously, from these studies, pure fatty infiltration as a sequel of "subpericardial over-fatness" is an extremely rare condition.[1]   Of the three fatal cases given in the table above one ended with great suddenness and the remaining two rather suddenly.   It will be noted that in the case of sudden death arterio-sclerosis was associated, and in one of those that terminated rather suddenly the lesions of chronic interstitial nephritis were noted.   It is evident that the arteries were also the seat of sclerotic change in the latter case.   The comparative frequency of atheroma, particularly of the aortic arch and the coronaries, as an associated lesion in fatty infiltration is undoubted. Thus, Forchheimer noted it in thirty-nine out of 122 cases of fatty overgrowth gleaned from the literature prior to 1889.   Of these, atheroma of the aorta occurred in twenty-one and similar lesions of the coronaries in fourteen cases.   Kennedy[2] invites attention to the comparative rarity of ossific deposit on the valves, and this view, long since expressed, receives support from the post-mortem findings of the three cases given in the above table, since valve lesions were not noted in a single instance.

Von Stofella[3] observes that when in subpericardial over-fatness the impulse is feeble and the first sound muffled and indistinct the aortic and pulmonary second sounds are of natural loudness, whereas in fatty infiltration the second sounds are feeble.   If arterio-sclerosis be associated, then the second sounds may appear to be somewhat accentuated ; this was true of Case IV. of my series.   In Case III. slightly increased loudness of the aortic second sound was present in the absence of hardening of the peripheral arteries.   The murmurs present in fatty infiltration have their usual seat in the aortic area, although they may also be heard in the mitral zone.   When met at the base of the heart they are attended with troublesome cerebral symptoms, syncope and vertigo in particular.   I have had no personal experience to confirm the view that this is also true of mitral murmurs in this affection.   Murmurs are not constant in this disease, having been present, as previously stated, in but two of the cases reported above.   They are not due to chronic valvulitis.   Says Forchheimer,[4] speaking of the bruit in fat-heart : " The bruit which is heard must, I take it, be due either to the irregular contraction of the muscular fibres of the heart or it must be hæmic in origin."   The evidence is overwhelmingly against its being due to valvular lesions, since these are the exception in cases of fatty infiltration. Personal observation tends to confirm the belief that I have long held regarding this question ; it is that the bruit heard in this affection may have different causes, many of which are as yet unknown.   It can

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[1] The writer would be indebted to anyone who will furnish additional cases.
[2] Loc. cit.   [3] Wiener klinische Wochenschrift, 1893, vi.
[4] Loc. cit.

scarcely be doubted, I think, that the murmur that appears in the advanced stages of the disease is at times due to relative incompetency, since many other indications of a dilated heart are in association.   In some cases the murmur heard over the aortic area is attributable to an associated chronic nephritis, since the presence of a basic systolic murmur in the latter disease is a matter of common observation.   Again, the bruit may be hæmic in origin or due to an abnormal, relaxed state of the heart-muscle or to weakness or insufficiency of the papillary muscles.[1]   The moderate degree of enlargement in four of my cases showed itself by an increase of dulness more to the left than to the right and more in the transverse than in the vertical direction.   It is probably occasioned principally by dilatation which may be preceded by and associated with some hypertrophy caused by the over-fatness. The rôle played by the infiltrated fat as well as the abnormally great subpericardial fat deposit must also be taken into account.   It is always exceedingly difficult and sometimes impossible to establish the boundary lines of dulness by percussion, owing to the extreme corpulency.   Not to be neglected in the treatment of these cases are measures directed to the removal of the over-fatness, the accomplishment of which enables us not only to determine accurately the size of the heart, but also to improve both the cardiac action and general condition of the patient.

A fatal termination is often due to spontaneous rupture of the heart, as occurred in all of the cases given in the above list that came to necropsy.   This accident, however, does not, as shown by the clinical notes of Cases IV. and V. in the above table, invariably cause sudden death.

MULTIPLE NEURITIS AND HÆMATOPORPHYRINURIA FOL-
LOWING THE PROLONGED INGESTION OF TRIONAL.

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That poisoning by trional is an exceedingly rare condition is readily borne out by the fact that it has been freely administered in thousands of cases in the past decade for insomnia, as a sedative, and as an antipyretic in a wide range of diseases, and is generally considered a reliable and effective remedy, without untoward effects.   I have been impressed by the readiness with which patients acquire the trional habit and the difficulty of inducing them to abandon its use.   Their attitude has, I think, often been determined by the physician who first

[1] See Schroetten, Ziemssen's Hand-book, vol. i. p. 26.

administered it to them with the assurance (which his experience has led him to believe) that trional is a safe, harmless drug, or at least as little harmful as any of our hypnotics.

While trional is an exceedingly useful drug, I believe we should always bear in mind its possible bad and even fatal effects, and for this reason I have thought it worth while to report a case of trional poisoning which came under my observation, together with several somewhat similar cases which I have been able to collect from the literature.

These cases are also interesting in that they bring vividly before us the etiological relationship existing between the ingestion of another of our synthetized organic drugs and the development of nervous affections. It is a well-recognized fact that the occurrence of neuritis has notably increased since the introduction and general use of the coal-tar products as remedies.

The following cases collected from the literature have certain points of interest not unlike my own case:

Schultz[1] reports a fatal case in a woman, aged fifty-four years, who took a gramme of trional a day for one month. After two weeks she had epigastric pain, vomiting, and loss of flesh and strength. A few days before death hæmatoporphyrin appeared in the urine.

Hecker[2] reports a case of '' progressive paralysis '' following the use of trional. There was unsteady gait, disturbances of speech, and general weakness. The patient recovered.

Reinicke[3] had a patient who took trional for four months. She had, as a result, headache, vertigo, epigastric pain, and temperature of 101.6° F. The urine was black and contained albumin, casts, and blood. She recovered after the removal of the drug.

Bresslauer and Joachim,[4] while using trional in a very large number of cases, had no severe cases of poisoning, but occasionally noted anorexia, constipation, giddiness, ataxia of the lower extremities, and oliguria.

Young[5] noted trophic changes in the skin of a woman, aged thirty-five years, which was caused by the continuous use of trional in 15-grain doses.

Herting[6] reports a fatal case in a patient, aged thirty years, who had taken tetronal and sulphonal and later a gramme of trional daily for a considerable period. The urine contained hæmatoporphyrin.

Gierlick[7] saw a patient who, after the use of trional, had tremor and ataxia in the arms and legs, depression, and loss of memory. The reflexes were normal; there were no changes in sensation, no trophic disturbances, and no hæmatoporphyrinuria. All these symptoms disappeared two weeks after the withdrawal of trional.

A. Claus[8] instances a child, aged five years, who after 10 grains of

trional walked unsteadily. A reduction in the dose caused a disappearance of the symptoms.

Stockton[9] reports a case of acute ascending paralysis which was fatal in a woman, aged twenty-seven years. Paralysis began in the lower extremities and advanced upward. Hæmatoporphyrin was present in the urine. The etiology was not clear, but the patient had taken small amounts of trional.

Putnam[10] saw a case of multiple neuritis following the use of trional and sulphonal. There was advancing paralysis, muscular tenderness, great emaciation, and death from the gradual involvement of the nerves of the heart and the respiratory muscles. The autopsy showed no changes in the cord, but a well-marked degenerative neuritis.

The history of the case which I wish to present is as follows:

Mrs. ——, aged fifty years, born and bred in New York City, had for twenty years been more or less of a chronic invalid, suffering from nervous depression, insomnia, and gastric disorders. According to her own statement, she had never had a wish, which money could gratify, unsatisfied. She had consulted many of the leading practitioners of medicine in this country and various parts of Europe, had submitted to all kinds of cures and systems of treatment, and had taken a great variety of drugs. At one time she had taken a large amount of trional and was continuing its use when she first came under my care; this she was induced to gradually diminish and finally gave it up entirely for a period of several months. At this time she was neurasthenic to a marked degree, but beyond a moderate anæmia there existed no organic disease.

About the middle of February, 1899, she suffered from obstinate insomnia and resumed taking trional, limiting the dose to 15 grains every other day, with an occasional intermission of three or four days. This continued until the evening of April 20th, when quite suddenly she developed pain in the abdomen of a severe colicky character, with extreme nausea and vomiting. At this time the temperature was normal and there was no abdominal tenderness or distention. The vomiting and pain continued for several days, rendering it necessary to interdict all food by the mouth and to resort to rectal alimentation. At this stage the case suggested the possibility of some acute poisoning. No further symptoms, however, could be elicited, but the administration of trional was stopped, and to control the severe pain morphine was used hypodermatically. On April 25th the heart became intermittent and there was developed a systolic murmur at the apex, transmitted to the left. At the same time the urine, which had been hitherto normal, became a dark red and contained a trace of albumin and a few granular casts. On the next day she passed only twelve ounces of nearly black urine, of a specific gravity of 1023, acid, with a small amount of albumin, no glucose, many granular casts, leucocytes, and small cuboidal epithelium; no blood. From this specimen I was able to separate by the usual methods[11] a substance giving the characteristic spectrum and color of hæmatoporphyrin.

The abdominal pain still continued and she complained of it bitterly.

The pulse increased in frequency and would frequently intermit; the heart action became weak and irregular, the apex murmur loud and rough, and there was added a loud murmur of aortic insufficiency. The area of cardiac dulness was moderately increased to the left. On April 30th she complained of tingling and pricking sensations about the vulva. The left knee-jerk was absent and the right was elicited with great difficulty. May 1st there was tingling in both arms; both knee-jerks were absent. On May 2d the patient complained of severe pain in the left elbow and weakness of the legs. The surface of the extremities showed diminished sensibility to tactile and thermic stimuli, but no absolute anæsthesia; this was particularly noticeable in the soles of the feet. The pain in the extremities increased, and two days later some loss of power was evident in the extensor groups of the left arm and left leg, but no actual paralysis. All the muscles reacted to Faradism, but the extensors only when a very strong current was employed. For several days there was a slight, irregular elevation of temperature, ranging from 99° to 101°. F. By May 12th a well-marked drop-wrist (double) and drop-foot (double) had developed. The flexors and extensors of the wrists and ankles failed to respond to the Faradic current. Tested with galvanism the extensors showed the reaction of degeneration, while the flexors responded slowly and only to a strong current. There was marked weakness of the extensors of the legs, but they all reacted to strong Faradism. While at rest the knees were held in the position of flexion. The surface of the body (particularly of the extremities) was so hypersensitive that it was necessary to keep the bed-clothing from touching the skin. There were periods of delirium, with hallucinations of time and space. She complained of excruciating pain in the extremities and abdomen and of slight girdle sensation and constriction about the chest. Loss of weight was commencing to be very apparent. The urine contained a trace of albumin and a few casts, merely a trace of hæmatoporphyrin. Heart slightly improved in rhythm and force; murmurs still present.

For a few days the patient remained in the condition just described and then began a slow, tedious improvement. Something over a week later she had recovered some slight, voluntary power of extension over the fingers and toes, although to the electric current the muscles still showed the reaction of degeneration, and it was many weeks before the extensors reacted normally to the galvanic current and contraction to Faradic stimulation was not re-established for three months—long after voluntary contraction was well advanced. There were moderate contractures of the ham-strings and Achilles tendon in spite of the use of passive motion and the application of correcting apparatus. These contractures gradually disappeared when the patient was able to use her hands and relearn to walk. There was considerable ataxia at times, but probably only such as would be accounted for by muscular weakness. The emaciation was extreme, the weight falling from 153 to 90 pounds. After some weeks the kidneys regained their normal condition. The heart slowly returned to the normal, leaving no evidence of valvular disease or enlargement. For a period of ten days there was a marked œdema of the lower extremities, which, however, disappeared with the improvement in the action of the heart. At the end of a year from the onset the patient was just beginning to walk without assistance. The recovery has since become complete.

This case brings out a number of points of special interest. The whole amount of trional ingested was not what one would ordinarily consider excessive—*i. e.*, about thirty doses of 15 grains each, a total of 450 grains for the two months. The onset presented the picture of a case of acute gastro-intestinal poisoning. Following this there was an acute degeneration of the kidneys and the presence in the urine of hæmatoporphyrin—a substance which is usually associated with poisoning by sulphonal and trional. The first of the nervous manifestations was a neuritis of the vagus and a subsequent trophic disturbance in the heart muscle resulting in dilatation and valvular insufficiency. The nature of the heart lesion seems clear in the light of the subsequent course, for with the improvement in the muscular tone the dilatation and valvular incompetence entirely disappeared, leaving a normal heart. Among other trophic changes may be noted the extreme emaciation and a marked thickening of the tissues about the joints of the fingers, which still remains.

The more marked affection of certain definite groups of muscles— *e. g.*, the extensors of the wrists and feet—suggests the selective action of trional for certain nerves or groups of cells in the anterior horns of the cord, not unlike that of the metallic poisons.

The nerves recovered their function in the same order in which they were impaired, viz., first the vagus, next those of the extremities of the left side of the body, and lastly those of the right side.

In view of the similarity in chemical constitution of trional and sulphonal it is not surprising that their toxic effects should have a close parallel ; this is borne out by the manifestations of a number of cases of sulphonal poisoning to be found in the literature. As to how trional produces its various injurious effects is a question of some doubt. One theory[7] ascribes to it a specific toxicity to the cells in the anterior horns of the spinal cord. In a case of sulphonal poisoning in which there had been weakness and ataxia of the lower extremities Helwig[12] reports an autopsy showing a degeneration of the cells of the anterior horns of the lower cord.

Another theory is that trional causes a very slow oxidation of the cells of the central nervous system, and this when long continued produces permanent changes, the manifestations in the stomach, bowels, and urine being secondary. It seems to me, however, that our theory must be even broader than this in order to include cases like that of Putnam,[10] in which on autopsy the lesion was found entirely confined to the peripheral nerves, the cord and brain being found normal.

Hæmatoporphyrin has been described as occurring in a variety of conditions associated with lesions of the nervous system. Ogden[13] reports hæmatoporphyrin as present in a fatal case of post-diphtheritic paralysis and Nakarai[14] isolated the pigment from the urine of six

cases of lead poisoning. In sulphonal poisoning its presence has been frequently demonstrated. The exact cause and mode of its production are still unknown. By some it is claimed that the original toxic substance acts as a direct irritant to the kidneys; by others that the function of the kidneys is modified by changes in the central nervous system. My own cases would argue for the latter theory, as the change in the urine did not appear until some time after the development of the nervous symptoms and a considerable period after the withholding of the drug.

Some years ago Morro[15] demonstrated that trional had a cumulative action, and this should be borne in mind when administering the drug for an extended period. It should not be given continuously, and while being used the bowels and kidneys should be kept active. To aid in the elimination of trional Goldman[16] recommends that citric acid be exhibited with it, and suggests that, if the urine becomes dark or cloudy, bicarbonate of soda and the drinking of aërated waters should ward off more serious developments.

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REVIEWS.

IMPERATIVE SURGERY. By HOWARD LILIENTHAL, M.D., Attending Sur-
geon to Mount Sinai Hospital, New York City. New York: The Mac-
millan Company.

THE tendency which in modern times has led to the fine subdivisions
of labor has caused the creation of specialisms in science. Specialism
of the proper sort is very useful. It develops individuals notable for
skill and distinguished for exact and profound knowledge. It leads to
the accumulation of a multitude of careful observations. It stimulates
authorship, experiment, and discovery. As Oliver Wendell Holmes
says : '' Specialists are the coral insects which build up the reef."

There are not wanting signs, however, that specialism has gone too
far, and we know positively that not a few specialists have no proper
equipment for their responsible occupations. A man should not be
allowed to proclaim himself a specialist any more than Wilkins Micaw-
ber, Jr., could proclaim himself a lawyer ; he should become a specialist
in the natural course of things, because of peculiar opportunity ; from
breadth of information, not from narrowness ; because of much knowl-
edge, not because of the absence of it. A man who takes up an exclu-
sive specialty soon after graduation, without having had the training of
some years of general practice, almost inevitably becomes the narrow
man, the one-sided man, the man who unduly exalts his particular line
of work and unjustly depreciates the work of others.

The general practitioner is sometimes too general. He is often not
special enough. He usually resolutely declines to invade the domain
of surgery, and in this self-abnegation, as a general rule, displays wis-
dom and an accurate estimate of realities. Surgery can be done well
and quickly only by one who has had considerable experience and has
trained himself by patient toil ; but the general practitioner ought to
be capable of meeting successfully, if not brilliantly, the common
emergencies of surgery.

We do not mean that he should become a surgeon. We particularly
would not convey the idea that he should ever undertake a difficult
operation when no real emergency exists. What we do mean is that he
should be able to apply the proper treatment—operative treatment, if
necessary—to conditions which threaten life unless there is prompt in-
tervention.

Some general practitioners do accident surgery admirably, and we
encounter these men particularly in mining and manufacturing regiont
and in railroad towns. Many general practitioners will not attempt
surgery even in an emergency. Numbers do attempt it, and bungle in
the trial. Dr. Lilienthal is persuaded that general practitioners should
be able to cope with surgical emergencies, and he has written this book
to aid them. He addresses his book to : '' The practitioner of general
medicine who rarely takes up the scalpel ; the specialist whose path
seldom leads him to the operating-room, and the recent graduate who,

although versed in the lore of books and lectures, has seen but little surgery at close range."

The author says of his book that " it deals only with the diagnosis and treatment of conditions which demand immediate operative measures, and it presupposes the absence of a surgeon and the impossibility or inexpediency of removing the patient or of waiting for expert assistance." Lilienthal's views as to the duties of the conscientious physician are as follows :

" Confronted by a grave emergency, where the life of a human being seems to hang upon the possibility of relief through surgical skill, the conscientious physician, when he feels that he is not sufficiently versed in the art and method of operating, will seek the assistance of an expert. Should time and place conspire, however, to make the presence of a surgeon impossible, the entire responsibility devolves upon the one who may chance to find himself in charge ; and unless he is willing to assume the risks of hesitation he must act the part of a surgeon and perform, to the best of his ability, the work before him. Again, should the crisis be one not of life or death, but where lingering disease or lasting deformity will probably follow delay, it is the clear duty of the physician to act and tide over the critical period."

These opinions are in line with the well-known views of the elder Senn, who has said (*Pacific Medical Journal*, August, 1899) : " Every physician qualified to practice his profession should have the necessary knowledge and manual dexterity to perform, at a moment's notice and with the simplest instruments and limited assistance, all life-saving operations in all cases in which prompt action is necessary to meet the urgent indications. In large cities the medical practitioner can secure the services of a professional surgeon without much loss of time, but occasionally he will be confronted by a case in which he has to act in order to save life. But the mass of general practitioners throughout the country are frequently thrown upon their own resources, and must be prepared to perform the most difficult operations when the loss of time necessary to secure surgical aid would jeopardize the life of the patient. A fair percentage of the practice and income of the village and country practitioners consists of and is derived from emergency work.

" The average medical student is more interested in surgery than in medicine, and I am sure the surgical training he receives ought to qualify him to practice emergency surgery with credit to himself and benefit to his patients. Most of the accident cases and surgical diseases requiring prompt operative treatment, as a rule, first come to the attention of the general practitioner. In accident cases the first aid rendered often determines the fate of the patient. Neglect and mistakes made in such instances are often difficult to balance and correct later. The general practitioner must be familiar with surgical diagnosis and must acquire surgical technique sufficient for him to act timely, wisely, and safely in all surgical cases in which immediate interference is an absolute necessity to save life or to protect the patient against remote disastrous complications. No physician should receive a diploma or practice his profession unless he is fully qualified to meet these requirements."

Lilienthal's book in most respects is admirable. The descriptions of operations are terse and clear, the directions are definite, and the cuts are not only beautiful, but really show something. The book comprises over four hundred pages, and the text is illustrated with more

than one hundred and fifty illustrations, most of them being " from photographs or drawings made during the progress of actual work in the author's practice."

In Chapter I. he enumerates the instruments of surgery and describes their uses, speaks of the materials for dressings and their preparation, sponges and their substitutes, sterilization, splints, and other rigid dressings. In the subsequent chapters he considers wounds and their treatment, the performance of an operation in a dwelling-room, the healing of wounds, special forms of infection (*i. e.*, erysipelas, phlegmon, abscess, furuncle, carbuncle, malignant pustule, acute osteomyelitis, acute suppurative arthritis), and the drainage of suppurating joints. He then proceeds to discuss wounds, injuries, and diseases of the head and face, the neck, the extremities, the thorax, and the abdomen ; intestinal obstruction, acute appendicitis, suppuration of the liver and gall-bladder, strangulated hernia, acute diffuse peritonitis ; wounds, injuries and diseases of the rectum and anus ; of the genito-urinary organs of the male ; of the generative organs of the female ; of the eye and orbital region, and of the ear and mastoid region.

In some instances we think Lilienthal forces the issue and goes a shade too far. It seems scarcely proper to advise a general practitioner who has not had any surgical training to perform gastrostomy, intestinal resection, œsophagotomy, and the radical cure of hernia after the relief of a strangulation. Were he to do these things he might become a veritable and ghastly emergency himself. We feel the same way in regard to appendicitis unless there is an abscess adherent to the belly wall. In this connection we refer the reader to the impressive remarks made by Weller Van Hook in one of the best papers we have ever read on the " Technique of Operations for Acute Appendicitis " (*Journal of the American Medical Association*, February 20, 1897). He says that a person who has never operated, or has only occasionally operated, should be persuaded that the operation for appendicitis is by no means always easy and simple. He considers it a matter for surprise and almost for horror to find that the majority of writers give an opposite impression, or, like Sonnenburg, assert that the operation is simple. It is Van Hook's positive conviction that one hundred cases of acute appendicitis will show a higher percentage of recovery under medical treatment, with incision of pointing abscess, than will one hundred like cases operated upon by one hundred surgeons, or even by twenty surgeons, who are gaining their first experience.

In spite of our disagreement with some of Dr. Lilienthal's contentions as to what cases are to be considered as emergencies justifying immediate surgical attack by the attending physician, we regard the book a timely one, and also esteem it as a carefully-written, entertaining, and instructive production.   J. C. Da C.

A TREATISE ON MENTAL DISEASES. By HENRY J. BERKLEY, M.D., Clinical Professor of Psychiatry in the Johns Hopkins University ; Chief Visiting Physician to the City Insane Asylum, Baltimore. Pp. 601. New York : D. Appleton & Co., 1900.

THE *Treatise* of Dr. Berkley, as the contents show, is an important study of the literature and pathology of mental diseases. Appearing

during the closing year of the century, it may be classed with other recent books upon the same subject that contain the last and best words that have been written during this wonderful cycle.   As the close of a century is suggestive of retrospection, so the opening of a new one admits of a note of comparison between the beginning of the old and the new and stimulates a hope of greater acquisition of knowledge during the period on which we have now entered.   At the beginning of the last century only two or three efforts of a primitive character existed in America for the care and treatment of the insane.   During the latter half of this period only was an approach made toward the scientific study of mental disease.   The earlier insanity literature (Pinel and Esquirol) was devoted mainly to the psychical manifestations of mental disease.   Such gross pathological lesions only as were apparent to the unassisted eye were described.   The histological studies of the structure of brain and nervous tissues in recent years, supplemented by the revelations of the microscope and improved technical methods, have materially aided investigations of the pathology of mental disease as well as those affections of the nervous system that are unattended with morbid mental conditions.   This advance may be said to have had a beginning during the latter third of the century just closed.   There seems to be recognized at last a field, with well-defined limitations, within which the alienist, the neurologist, and the pathologist may each, in his own way, during the coming century engage harmoniously in the solution of the problems that confront him, unvexed by jealousies and contentions.

Dr. Berkley has clearly shown in his book the co-ordination and relation of pathology and psychiatry, which may be stated to comprise the two grand divisions of the work.   Ninety-five pages are devoted to histology of the central nervous system and general pathology.   Much of this portion is of a high technical character, and while it may not be fully appreciated by every reader, yet on examination it must be conceded that all of the studies have been carefully made along approved lines and that the conclusions are logically correct.   The portion of Part II., devoted to Special Pathology and Pathology of the Cerebral Vessels, is of interest in these days of the discussion about the neuron and intracranial circulation.   Investigations in cell pathology have been advanced by improved methods of staining or experimental technique, which are explained in detail, so that the author confidently assumes " the veil is being slowly withdrawn and we are able to distinguish the true from the artificial lesion."   While the pathologist by mechanical and other devices may thus bring us in close touch with the very centres from which psychic action proceeds, yet notwithstanding the ambitions of science, we have no expectation the chasm will be crossed or that the impenetrable secret of psychical force will be readily yielded, though it may continue to be a subject for theorizing and speculation.

The important chapter on Pathology of the Cerebral Arteries and Veins is a practical demonstration of the effect of irritant poisons, as alcohol, syphilis, and other toxins, in the production of arterio-sclerosis and endarteritis.   It is illustrated by several plates in colors showing the various degenerations that result from toxic and other agencies which affect the middle and inner coats of vessels, the lumen, and surrounding tissues, and go far to demonstrate the manner in which the

nutrition of the nervous mass may be affected, and account for other clinical aspects of mental disease.

The remainder of the book, or over four hundred pages, is devoted to the symptoms, causes, and therapy of mental diseases. The author recognizes the difficulties surrounding an accurate classification of the many forms of insanity and the confusion that has resulted. There are objections to a nomenclature founded upon clinical symptoms, yet during the course of the disease the psychical or mental manifestations may be the only evidence of any departure from the normal state. The " etiological basis is equally defective, as the causation is frequently unknown," and from it various forms may be evolved, and causes so called are too speculative to have value. A classification based upon the morbid anatomy might be considered valuable if a sufficient amount of knowledge had been already accumulated. As every writer has assumed to himself the privilege of conforming a nomenclature to suit his own views, the author has made a venture in this direction in parts of his book. For instance, he uses terms to describe forms of insanity as having an adjective sense, namely, " syphilitic insanity," " alcoholic melancholia," " alcoholic epileptic insanity," " menstrual insanity," " religious paranoia," etc. Many of these terms and other forms so called used by writers are misleading and only add to the existing confusion by conveying an impression that they stand for distinct entities or diseases, whereas they are only stages or symptoms that appear in the course or progress of a case of insanity or common to many forms from divers causes. The general adoption of such a nomenclature would be a warrant to assign an insanity to any supposed cause, illustrating rather the theories and resources of a writer than results of clinical study. We have supposed the tendencies in recent years were rather to restrict than expand the nomenclature. We forbear criticism, however, as the author has introduced so many good and helpful forms and special studies, as " insanities without ascertainable alteration of brain substance," " insanities consecutive to organic lesions of the cerebral substance," " intoxication insanity," " insanities following bacterial and toxalbumic poisoning," " insanities following autogenic poisoning," " insanities of the psychical degenerate," and those accompanying or following " constitutional neurosis."

The author arranges the several forms of mental disease under four groups as most convenient, and, we may add, most helpful for study, viz.: Group I. *Mental diseases without ascertainable pathological alteration of the brain substance.* Group II. *Mental diseases sequential to ascertainable alteration of the brain substance.* Group III. *Insanities due to inherited or acquired mental instability.* Group IV. *Studies of complete or incomplete retardation of the psychical (and physical) development.*

This grouping is strictly correct and comprehensive. Under the first can be included all cases of mental disease having an origin in neurasthenic conditions (from whatever causes they may arise), sepsis, and toxic agencies that result in disordered mental manifestations. In this group may be placed acute insanities complicated with delirium, acute delirium, and acute delirious mania. This method of grouping is also most helpful in forming an opinion as to the prognosis of a case, the first group furnishing the greatest proportion of recoveries in hospital reports. It may be further said of this group that, notwithstanding the

acuteness of the symptoms, when death takes place little or no trace of disease is discovered. Whatever evidences of disease may have existed before death they disappear subsequently or cannot then be discovered. The author has properly emphasized and described a large number of mental affections belonging to this group, which is a marked feature of this and other recent books on mental disease. While the pathologist has been engrossed in the examination of cells and cutting sections, less attention, in comparison with the importance of the problem, has been given to the condition and quality of the circulation and functional disturbances of the bodily organs which have so much to do with the best treatment of the insane. There are unquestionably many cures directly effected by medical treatment, and we are waiting for the physiological chemist rather than the pathologist to tell us what has been done to restore our patient and how the methods may be improved. The field is open, but this phase of the subject has scarcely been touched even in the recent books.

This volume, presenting honestly the results of scientific work, much of it done or verified by Dr. Berkley, should be welcomed and its contributions added to the general stock. It may be said of all insanity books that their authors and their readers deal with complex and unknown conditions that are not yet susceptible of mathematical demonstration. As a consequence, a personal element may even enter here which impairs the value or estimate to be placed upon criticism.

In a " note " or preface Dr. Berkley makes the announcement that " the absence from English literature of a comprehensive practical work on mental diseases has led the writer to prepare this treatise, embodying a consideration of all the principal forms of psychical disturbance." Notwithstanding that under the head of " Literature," which follows many chapters or parts, 432 references to Continental writers and only eighty-three belonging to English-speaking people are made, the assumption which is implied that an "absence" or even dearth actually exists will hardly be received without dissent.

J. B. C.

DEUTSCHE MEDICIN IM NEUNZEHNTEN JAHRHUNDERT. Säcular-Artikeln der Berliner klinischen Wochenschrift. Herausgegeben von C. A. EWALD und C. POSNER. Band I. Berlin: Verlag von August Hirschwald, 1901.

GERMAN MEDICINE IN THE NINETEENTH CENTURY. Edited by C. A. EWALD and C. POSNER.

THE articles contained in the volume before us are reprinted from the *Berliner klinischen Wochenschrift.* All of them treat of some technical subject, especially referring to the histological aspect. Attention has been called so frequently and in such various places to the wonderful advances made in the past century that special works treating of advances of special peoples have a local and also a general value. While the title indicates an especial attention to the German contributions to the medical sciences, the editors are careful to state in their preface that a narrow reference to the work of Ger-

man physicians alone would give a very imperfect view of the progress of science, and while they point with pardonable pride to the contributions of Germans to philosophy and natural history, and especially to medical science, they admit the equal value of other contributors. We cannot undertake to review the articles in the volume before us. Their character may be judged by a few of the titles. Virchow contributes a short discussion of the influence of new names and new points of view in determining progress in pathology, and shows the importance of proper names for newly discovered conditions and for new aspects of known conditions, instancing some of the diseases or pathological processes which he himself discovered. Hirschberg's article on the development of ophthalmological knowledge in the nineteenth century is long and interesting and will be consulted by all who have a special interest in this study. Ewald in discussing auto-intoxication, Ponfick in an account of the development of knowledge regarding inflammation, Schleich in a paper on local anæsthesia and narcosis, Frosch in a contribution on the plague in the light of recent investigations, Flemming in a paper on cell-division, Babes in a discussion of rabies from the beginning to the end of the nineteenth century, contribute interesting accounts of subjects of unusual importance and interest at the present time or of topics that have assumed new importance from changed points of view.

Taken as a whole, the twenty-six articles in the present volume are most interesting expositions of the development and present status of knowledge regarding a variety of topics. A. S.

A Practical Treatise on Fractures and Dislocations. By Lewis A. Stimson, B.A., M.D., LL.D., Professor of Surgery in Cornell University Medical College, New York; Surgeon to the New York and Hudson Street Hospitals, etc. Third edition, revised and enlarged, with 336 illustrations and 32 plates in monotint. New York and Philadelphia: Lea Brothers & Co., 1900.

THE present edition is issued about a year after the appearance of the second edition. It is evident from this fact that the subject of fractures still has a firm hold on the profession in spite of the allurements of operative surgery. It also speaks well for the value of the book itself.

The subject of fractures was almost wholly rewritten for the edition of 1899. The question of operative reduction in the treatment of dislocations was also discussed.

In the present edition numerous additions have been made, one of the most important being traumatic hæmatomyelia in reference to the prognosis and treatment of injuries of the spinal cord.

Twenty new illustrations have been substituted or added, and the number of plates has been increased from twenty to thirty-two, with nineteen new figures, all but one being reproductions of skiagrams.

The subject of fractures is treated in 401 pages, and while as much is given as the space permits there is still need for a somewhat more elaborate treatment of some parts. The literature on the subject of

fractures has been tremendous and allusions to all the new suggestions is impossible, still we would have liked to have seen the operative treatment of fractures discussed more in detail. It is one of the active issues of the day. The numerous additions of new skiagrams show that attention has been devoted to that method of examination. In the treatment of fractures of the elbow-joint by full flexion the author states that it is no more convenient than rectangular flexion and gives no more security against displacement. While we believe he is nearly or quite right in his conclusions, it still seems a rather cursory way to treat a subject in favor of which so much has been written in recent years. In the chapter on Fractures of the Skull those of the base are hardly more than alluded to. It is to be regretted that the excellent work of Charles Phelps on the *Traumatic Injuries of the Brain* is not even mentioned. The chapter on Dislocations of the Hip contains no reference to the recent work of Oscar H. Allis. In importance it is at least equal to if not greater than that of Bigelow's. McBurney's method of reducing a dislocation of the shoulder with fracture is given, but not Allis' method of reducing a dislocated hip with fracture. In the treatment of congenital dislocations of the hip Lorenz has discarded his own operations and now advocates forced extension and reposition. While some omissions occur, they are not sufficiently numerous to mar the work, and, taken as a whole, we like it perhaps better than any other treatise on the subject in our language. The method of treatment of the various subjects is perfectly clear and intelligent. The information contained is extensive and the advice given is sound. It is evidently the work of an accomplished surgeon of wide experience and good judgment, and is expressed in a style free from verbosity or obscurity. It is a volume which should find a place on the shelves of every practitioner who is called to treat fractures or dislocations.

G. G. D.

NORMAL HISTOLOGY. By EDWARD K. DUNHAM, Ph.B., M.D., Professor of General Pathology, Bacteriology, and Hygiene in the University and Bellevue Hospital Medical College, New York. Second edition. 318 pages, 244 illustrations. New York and Philadelphia: Lea Brothers & Co., 1900.

OWING to the important relation of the study of histology to both normal and pathological anatomy, it is desirable that the student of medicine begin this subject early in his course. It is, therefore, of great consequence to his future progress that the method of his study be carefully considered. It is, for example, of the utmost importance that the broad, fundamental principles of the science be inculcated and that proper attention be given to the cultivation of the scientific habit of mind.

The volume under discussion has evidently been written with full appreciation of these facts. An introductory chapter prepares the student for a consideration of the distinctions between the different elementary tissues as well as for an account of the cell and its properties. The succeeding chapters, which follow in what might be called the

usual order, constitute a concise exposition of the known facts of the science.

A criticism that might be made is that the text, in many places, is rather too brief and lacking in emphasis of salient points. This is notably true of the chapter dealing with the liver, where clearness has been sacrificed to conciseness. This is a fault in that it presupposes upon the part of the student a knowledge of the subject which usually he does not have.

The book is adequately and beautifully illustrated, many of the 244 engravings being original.

An excellent chapter on Histological Technique constitutes Part II. of the volume. The typography is in line with the usual high character of the Messrs. Lea Brothers & Co.'s publications.   J. C. H.

PATHOLOGY AND MORBID ANATOMY.   By T. HENRY GREEN, M.D., F.R.C.P., Physician and Lecturer on Clinical Medicine at Charing Cross Hospital, and Senior Physician to the Hospital for Consumption and Diseases of the Chest, Brompton. Revised and enlarged by H. MONTAGUE MURRAY, M.D., F.R.C.P., Physician to the Out-patients and Lecturer on Pathology and Morbid Anatomy at Charing Cross Hospital. Ninth American, revised from the ninth English edition, by WALTON MARTIN, Ph.B., M.D., Assistant Demonstrator of Anatomy, College of Physicians and Surgeons, Columbia University; Attending Surgeon to the Out-patient Department, Roosevelt Hospital.   565 pages, with 4 colored plates and 339 illustrations.   Philadelphia and New York: Lea Brothers & Co., 1900.

THIS well-known, very useful, and readable text-book, which originally included only general pathology, has met at the hands of its revisers a metamorphosis in which it has lost none of its original value and interest, though transformed into a complete treatise upon pathology and morbid anatomy. It has, moreover, in a most remarkable manner been made to include an immense amount of new material without appearing to have lost any of the valuable matter it contained before, yet without greatly increasing its size.

The edition of 1900 is greatly improved over that of 1898 both by the introduction of many new illustrations and a revision of the text. In his preface Dr. Murray apologizes that "some increase in the size of the book has been found unavoidable," yet upon comparing the two editions we find that of 1898 contains 571 pages, and that of 1900 565, the size of the new pages being but little larger than the old ones.

The book opens with a new chapter upon Malformations. The matter all through has been revised and much of it rewritten. It seems to be thoroughly up to date. Excellent new figures have been introduced, among which should be mentioned a skiagraph showing a hand with chondromata and reproductions of photographs of the topography of the brain and some of its lesions.

The title-page announces that the book has four colored plates, but

we find that while there are four plates, only three of them are colored. These are very good and represent the malarial parasites and the important blood diseases. The uncolored plate shows normal and degenerated nerve cells stained by Nissl's method.

The pathology of nutrition is omitted, probably because of the space it would necessitate. It is, however, a disappointment to find diabetes, uræmia, scurvy, cachexia, acromegaly, myxœdema, Addison's disease, etc., either not mentioned at all or given a few lines under other headings. This is particularly true, because the author has thought it necessary to devote so much space to general considerations regarding the bacteria, their biology, cultivation, and observation. While the matter upon bacteriology is certainly good and undoubtedly very important, it is very likely that a student of medicine will refer to some text-book upon bacteria for his knowledge of them rather than receive it from this brief writing. On the other hand, as there are few other sources of information concerning the pathology of nutrition and metabolism, he might be glad to derive it from his text-book of pathology.

<div style="text-align: right">J. McF.</div>

DISEASES OF THE NERVOUS SYSTEM. By H. OPPENHEIM, M.D. Authorized translation by EDWARD E. MAYER, A.M., M.D. First American from the second revised and enlarged German edition. Philadelphia and London : J. B. Lippincott Company, 1900.

IT is hardly necessary to review this book except as a translation, as the first German edition has been before the public since 1894. Every neurologist who is familiar with the German language has long ere this learned to appreciate Oppenheim's text-book; but, unfortunately, it was a sealed volume to many whose knowledge did not extend beyond the English language, and Dr. Mayer, therefore, has rendered a valuable service to the great English-reading medical public. The amount of information that Oppenheim has crowded into 874 pages (American edition) is remarkable, and it is this condensation that makes the volume so valuable to the student and the busy practitioner, who want the important facts of neurology in as small a compass as is consistent with accuracy. The illustrations are satisfactory, although some could be improved upon, notably the one on page 94. Illustrations may be of value in the teaching of nervous diseases, especially when accompanied by legends containing a short description of the case represented. The translator has not been enslaved to a notable degree by German methods and forms of expression, but has made a liberal translation, and yet one that appears to be accurate. This is more difficult to do from the German than from the French. Occasionally expressions are detected that are somewhat objectionable, as, for example, '' gravity abscess.'' This is a literal translation of *senkungsabscess*, but the English expression is less pleasing to the ear than the German. The translator must have been frequently puzzled in selecting the best English equivalent for the German. This American edition will doubtless be of much service.

<div style="text-align: right">W. G. S.</div>

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Mechanical Treatment of Anasarca.—K. Dehio (*St. Petersburg med. Wochenschrift*, December 23, 1900) discusses the methods that have been suggested for the mechanical treatment of anasarca and describes the apparatus which he has devised for this purpose. It consists of a rubber band widened at one area, at which point there is an opening about 8 cm. in diameter. In this opening is placed a rubber funnel, which is fastened to the band. The outlet of the funnel is connected with the tube, and after careful disinfection of the skin a number of incisions are made close to each other, the funnel is closed by means of the band, and the incised area is kept absolutely protected from air and from infection. He reports fifteen cases which he has treated with this apparatus, with apparently extremely successful results. He states that as much as ten or twelve litres may escape in this way in one day. It is important not to put the funnel on very tightly, as this interferes with the flow; it is merely essential that it shall be so applied that air cannot enter beneath it. It is always important that the patient should lie with the incised area on a low level. Dehio believes that proper mechanical treatment of anasarca will have very successful results if it is undertaken sufficiently early. One valuable point about the apparatus is that it allows of a ready collection of the fluid. He describes the fluid which he obtained in a series of cases of nephritis, and compares it with that obtained in cardiac failure with general venous stasis. The most striking fact was that while the albumin in the cardiac cases (estimated by the Essbach method) was always above two parts in a thousand and reached as high as five parts in a thousand, in the nephritic cases it never went above 1.5 parts in a thousand and in most cases was present in traces only, but estimation of the nitrogen showed that this was about equal in the two classes of cases; it was a little higher, as a rule, in the cardiac cases, but there was not a great difference. The conclusion which Dehio

reaches after examination of these figures is that in nephritis the fluid of
the anasarca contains, beside albumin, some nitrogenous substances which
are absent in the mechanical œdema of cardiac disease.   These are probably
products of protein metabolism which are not properly excreted through
the urine.   He also discussed the character of the fluids seen in ascites, in
hydrothorax, and in anasarca.   The observations of other workers have
shown that in general the transudates in cases of nephritis are of lower
specific gravity than in cases of cardiac failure.   In nephritis, for instance,
the specific gravity of the ascitic fluid averages about 1006, that of hydro-
thorax 1007, and that of anasarca (Dehio) 1007.   With general cardiac
failure the ascitic fluid is about 1012, the fluid of hydrothorax is about the
same, while that of anasarca (Dehio) is almost the same as the anasarca of
chronic nephritis—i. e., 1008.   The fluids of hydrothorax and ascites have
been found to contain much less albumin in cases of nephritis than in
general circulatory failure—conditions similar to those found by Dehio in
anasarca.   For instance, the ascites of nephritis was found to contain 0.2
per cent. and that of general circulatory stasis 1.7 per cent.   It is notable that
the fluid of the subcutaneous tissues seems, according to Dehio's investiga-
tions, to be much poorer in albumin than that of transudates into the peri-
toneal and pleural cavities, as his average for anasarca was in cardiac cases
0.36 per cent. albumin, while in ascites and hydrothorax there have been found
1.6 per cent. and 1.3 per cent.   The results which Dehio obtained seemed to
confirm the statement previously made by Hoffmann, that if the fluid of
anasarca contains less than 0.1 per cent. of albumin, severe disease of the
kidneys may be diagnosed.   Dehio noticed all grades of variation between
the very low percentage in pure nephritic cases and the high percentage in
cardiac cases—a very natural observation, as the renal condition and the
cardiac condition have varying degrees of importance in such cases, and it
is only rarely that anasarca is purely nephritic or purely cardiac.   He com-
pares the results of the study of the œdema fluid and normal blood plasma,
and directs attention to the fact that while salts were present in both cases
in about the same amount the albumin and the dry residue in general were
far greater in blood plasma than in the fluid of œdema.   This indicates, to
his mind, that in œdema the capillary walls permit the salts to pass very
easily, while they maintain considerable resistance against the passage of
albumin and other organic substances.

Bacteriology of Rheumatism —F. MEYER (*Deutsche med. Wochenschrift*,
February 7, 1901) states that in investigating cases of acute articular rheu-
matism bacteriologically, after unsatisfactory results from the direct exami-
nation of the joint exudate, he made cultures from the tonsils and discov-
ered practically regularly the presence of a diplococcus which grew in chains
and which in its bacteriological characteristics had a close resemblance to
the organism previously described by Wassermann, but was not identical
with it.   This organism was not found on the tonsils of persons who had
not acute rheumatism.   When injected into animals it produced a sero-
purulent exudation in the joints, which was usually sterile.   In about one-
fifth of the animals so injected there was a verrucose or ulcerative endocar-
ditis.   He does not think that one can yet state positively whether the strep-

tococcus is actually the cause of rheumatism, or if it is the cause of rheumatism whether it is the only cause. The number of cases as yet investigated is too small.

MENZER (*Deutsche med. Wochenschrift*, February 14, 1901), in discussing Meyer's results, directs attention to the fact that streptococci have been found repeatedly on the tonsils and in the joint exudate in cases of rheumatism, and that Meyer's results, while important, are not wholly new, though the fact that the streptococci found by him and by Wassermann produced changes in the joints and endocardium is important. He describes his own results in four cases. In two of these the exudate from the joints showed the presence of streptococci, of diplococcus form, and in three cases, one of which was one of those previously mentioned, he obtained diplococci in streptococcic form from the substance of the tonsils. Portions of the tonsils was excised and bacteriological preparations were made from the cut surface. He thinks that it is still a question whether one will constantly be able in cases of acute rheumatism to obtain bacteria which produce joint changes in animals. It is also doubtful whether only the streptococci that have been found will show these characteristics. It is further necessary to consider the possibility that such changes may be produced by the microorganisms which are found on the tonsils in normal persons. He considers it possible that some one form of organism among those already described will be found to be the specific cause of acute rheumatism, though this is certainly doubtful, considering the close relation which rheumatism bears to atypical rheumatoid affections and to pyæmia. Still, from a clinical standpoint, rheumatism, to his mind, presents the appearance of a morbus sui generis.

Bacteriological Examination in a Case Resembling Typhoid Fever — SCHOTTMÜLLER (*Deutsche med. Wochenschrift*, 1900, No. 32) has examined the blood in fifty cases of typhoid fever, and found the specific bacilli in forty. Among the cases was one clinically resembling typhoid, in a patient who, convalescent from erysipeloid of the finger, was observed from the beginning. After three days of subnormal temperature the disease began with malaise, headache, and coryza; slight redness of the conjunctiva, the nasal mucous membranes, and pharynx. The temperature was 104°, pulse 80, full and regular. On the fourth day the spleen could be felt. On the sixth day the conjunctiva was normal, the tongue dry and red; there was bronchitis. On the ninth day roseolæ appeared, and became more numerous in the following days. Continued fever, at about 104°, lasted ten days. Lysis then began; convalescence was interrupted by slight elevations of temperature. There were no characteristic stools. The blood on the sixth day gave colonies of bacilli, resembling those of typhoid fever in many respects, especially morphologically and tinctorially, but differing in others. It did not coagulate milk; it produced acid; it did not form indol, but it caused fermentation. The serum reaction of the patient was negative with fresh typhoid cultures in dilutions of 1 : 20 to 1 : 100. The patient's own serum caused agglutination of his own cultures at 1 : 50 and 1 : 20, but not at 1 : 100, but after the fever even a dilution of 1 : 100 was effective on the new bacilli, not on typhoid cultures. Serum from other cases of typhoid fever

caused no agglutination, except in one case, at 1 : 20. The case brings additional proof that we can have a disease clinically resembling typhoid fever without the specific bacilli. In the present instance we are without evidence as to the anatomical changes. The condition is obviously rare, but aside from its general interest it may have some bearing on the exceptional cases of typhoid that do not give the Widal reaction.

Septic Endocarditis.—E. MÜNZER (*Zeitschrift für Heilkunde*, Band **xxi.**, p. 251) particularly directs the attention of the general practitioner to the not infrequent occurrence of prolonged febrile conditions of obscure origin, and dwells on the importance of the group of cases, belonging under this heading, which Litten terms chronic recurring septic endocarditis. Münzer reports a series of cases. In three of these there was a very definite relation to rheumatism or association with this disease, at any rate; in two cases the symptoms of endocarditis occurred after articular rheumatism, in the third after muscular rheumatism. The general relation between rheumatism and endocarditis is well known, and it is now recognized that rheumatism is of bacterial origin ; also, it is known that the micro-organisms found in rheumatism are generally those that are found in septic endocarditis, hence a possible connection between the two diseases is readily seen. It is very difficult to draw the line between mere benign rheumatic endocarditis and a septic endocarditis associated with rheumatism, particularly when the person with rheumatic endocarditis shows a febrile recurrence, with signs of renewed involvement of the endocardium. There are undoubtedly cases which may be considered connecting links between pure septic endocarditis and what we commonly accept as rheumatic endocarditis. Münzer lays emphasis upon the fact that in the beginning of these cases cardiac symptoms are absent, and the diagnosis must be established upon a rise of temperature in the evening, which is later followed by an erratic course of fever, with chills, swelling of the spleen, sometimes definite symptoms of infarct, more or less pain in the joints, and hemorrhages into the skin and into the choroid. The most important diagnostic difficulty is always in distinguishing the cases from typhoid fever and malaria. The prognosis is bad, but always absolutely so.

Metabolism in Obesity.—A. JAQUET and N. SVENSON (*Zeitschrift für klin. Med.*, Band xli., Hefte 5 and 6) contribute a study of the metabolism in three cases of obesity. There has been much discussion as to whether there really exists any condition in which there is suboxidation of fats and obesity resulting from this. The existence of such a condition, though suspected, has not been proved. If the results reported in this paper are confirmed it apparently does exist. The authors found in consonance with other observers that the respiratory interchange in three obese subjects was normal during a period of temporary abstinence from food, but they lay stress upon the fact that when observed after taking food the respiratory interchange showed a much briefer and less pronounced increase than is customary in normal persons. This, they believe, is sufficent to explain the fat deposit. The reaction of the respiratory interchange to muscular exercise seemed to vary according to the condition of the other organs. In one case

it was normal or about normal; in two others a relatively slight increase in muscular exercise caused a marked increase in the consumption of oxygen. The use of thyroid was tried in these cases and a marked decrease in weight was produced. In the one series of studies the authors believe that they demonstrated an actual diuretic effect of thyroid extract, and they believe that in this case the loss of water was sufficient to explain the loss in weight. In other instances, however, there was an increase of metabolism and the oxidation processes seemed to be definitely increased after taking food, though there was not the same increase during abstinence.

Determination of the Species of Blood.—UHLENHUTH (*Deutsche med. Wochenschrift*, February 7, 1901) contributes some very interesting results which he has obtained in the effort to provide a method for the differentiation of various forms of blood. He injected rabbits with 10 c.c. of defibrinated cow's blood, making five such injections at intervals of about a week. He then made a perfectly clear solution of cow's blood in about one hundred parts of water, filtering off any deposits which formed. He introduced about 2 c.c. of this solution into small test-tubes and added an equal amount of 1.6 per cent. salt solution. A cloudiness resulted when the blood-serum of the rabbit was added to the solution. He considers it extremely important to use physiological salt solution in diluting and not mere water, as normal rabbit serum will become cloudy if introduced into a watery solution. He states that the results seem to be entirely specific, as solutions of a large series of blood from other animals caused no reaction. When, however, the blood of other animals or of human beings was originally injected into the rabbits whose serum was used in the test, the same reaction occurred with the special form of blood used, but with no other. He believes that in this way one may definitely tell human blood from other blood. The reaction was obtained from blood of various species that had been dried for weeks, dissolving it first in physiological salt solution.

Bacteriological Diagnosis of Typhoid Fever.—E. SCHOLZ and P. KRAUSE (*Zeitschrift für klin. Med.*, Band xli., Hefte 5 and 6) contribute a study of some of the bacteriological methods now in use in the diagnosis of typhoid fever. Scholz discusses the Widal reaction and reaches the conclusion that it is of little value in early diagnosis. He ranges it among other symptoms of typhoid fever, all of which may at times be absent or appear only late in the disease. He believes that the greatest weight should be laid upon exact clinical observation of the whole course of the disease in distinguishing typhoid fever from similar conditions. The latter part of his observation is undoubtedly proper, but his observations concerning the Widal reaction were confined to the investigation of only 55 cases, 47 of which were positive and 8 negative. Among the positive cases there were 3 in which the reaction appeared only after five weeks. The series of 8 negative cases contained 2 in which the last test of the reaction was made on the ninth day; in 2 others the reaction was undertaken on the eighteenth and twenty-fifth days, but in the remaining 4 the test proved negative when undertaken between the sixty-second and the one hundred and sixth days of the disease. These observations, while of interest, are too few in number

to be compared with the large numbers of cases already reported, which show that the reaction is much more important than most other symptoms of the disease. Krause has studied the value of investigation of typhoid spots for bacilli. In 14 of 16 cases he obtained characteristic bacilli, and he considers this a more important method of examination than the Widal test, as five cases which showed bacilli in the spots showed no agglutination. He directs attention, however, to the fact that the bacilli may disappear from the spots within three to five days after the appearance of the spots, and that several spots should always be examined, as bacilli may be absent from some of them. He recommends making several moderately deep incisions into the spots and scratching the surface thoroughly when inoculating media from the spots. He admits that this method is of limited value as a diagnostic measure, because spots are absent in a considerable number of cases, other eruptions are readily confused with the typhoid eruption, the spots oftentimes do not appear early enough to be of great aid in diagnosis, and bacilli cannot always be obtained from them. [This method of examination, because of the technical difficulties connected with it, cannot ever prove as useful as the Widal reaction in the great mass of cases, as it is impossible to carry it out without fairly extensive bacteriological apparatus and the services of a bacteriologist of some skill, while the Widal reaction requires little apparatus, comparatively little special experience, and is less disturbing to the patient.] Krause has also studied Piorkowski's method of inoculating a urine-gelatin medium with the stools of suspected cases. He investigated 19 cases, making in all 123 tests. He found that in three-fourths of these instances the test was positive, while in four typhoid bacilli were not obtained. He thinks that this culture medium is a valuable addition to bacteriological methods, but that for diagnostic purposes the appearances of plate cultures alone are insufficient, and the bacilli must always be recognized by the usual chemical and biological measures. He found that this method could be more easily carried out, without waiting for urine to become alkaline spontaneously, if the urine were inoculated with the micrococcus ureæ and kept in a thermostat for from twenty-four to forty-eight hours. The dilute gelatin used in this medium becomes fluid very easily, however, and the medium cannot be satisfactorily used in summer time.

Gastric Carcinoma.—E. Jürgensen (*Deutsch. Archiv für klin. Med.*, Band lviii., Hefte 5 and 6) describes a case of carcinoma of the stomach in which it was notable that the HCl secretion was present until shortly before death and that there was, marked variation in the daily amount of urine. At times practically no urine was secreted, and at such times there was marked tendency to somnolence, the reflexes were decreased, and the pupils were much contracted. The administration of large quantities of water per rectum and subcutaneously caused the disappearance of these symptoms coincidently with increase in the excretion of urine. The most rational explanation of the symptoms seemed to be poverty of fluids in the tissues. In another case of carcinoma there was marked fever of an irregularly remitting character. With the attacks of fever evidences of breakdown of the tumor were shown in vomiting of blood and increased pain and tenderness. The fever was attributed to the absorption of the products of

tumor destruction. In the periods in which the patient was free from fever the urine showed marked diazo-reaction and there was decided rapidity of the pulse. These symptoms were also attributed to absorption of toxic materials formed in the tumor destruction. Rütinmeyer (*Korrespondenzblatt für Schweizer Aerzte*, 1900, Nos. 21 and 22) discusses the clinical conditions in gastric carcinoma. Of 86 cases he found that 14, or 16 per cent., showed free HCl upon the first examination. This is somewhat higher than the percentage ordinarily given. Of these 14 cases 6 were certainly developed upon the basis of an old ulcer. In the other cases this question was in doubt. The free HCl was often found still present when the tumor had become large and even just before death. Distinct lactic acid reaction was obtained in 87 per cent. and Oppler-Boas bacilli were found in 80 per cent. In three cases the carcinoma was observed very early in life, during the fourteenth, nineteenth, and twenty-third years respectively. Rostoski, in an abstract of this article (*Centralblatt für innere Med.*, January 12, 1901, p. 52), stated that he had recently seen a case of carcinoma in a patient aged sixteen years. The case came to autopsy and the diagnosis was confirmed.

Mitral Stenosis without Murmur.—Strauss (*Centralblatt für innere Med.*, January 12, 1900) demonstrated to the Berlin Medical Society a case of mitral stenosis in which there had been no murmurs during life, but the diagnosis had been established. The patient was a glassblower, aged twenty-one years, who had had dyspnœa for years, with occasional hæmoptysis; he had no rheumatic history. His pulse was small and irregular, there was marked enlargement of the cardiac dulness, pulsation was visible in the third left intercostal space, and there was marked epigastric pulsation, but the cardiac sounds were pure. The reasons for making the diagnosis were irregularity of the pulse, with accentuation of the second pulmonary sound, marked epigastric pulsation, and circumscribed tenderness about the cardiac apex. The post-mortem showed an extremely high grade of mitral stenosis, with narrowing of the aortic orifice and some aneurismal widening of the pulmonary conus arteriosus.

A. Fraenkel, in discussion, stated that he believed that the reason that aortic stenotic murmurs are likely to disappear shortly before death is that the energy of the heart action grows weaker. He spoke of a case of aortic stenosis in which there was a loud murmur two years ago. The patient recently died, the murmur being heard shortly before his death only as a soft, blowing sound at the apex. Autopsy showed a high grade of aortic stenosis.

Volvulus of the Stomach.—Wiesinger (*Deutsche med. Wochenschrift*, February 7, 1901) describes a highly interesting case of volvulus of the stomach, with complete occlusion of the cardia and pylorus and associated with acute fat necrosis, in which entire cure followed operation. The patient was a man, aged forty-one years, who, after a dietetic indiscretion, was taken suddenly ill in the midst of entire health. He had vomiting, constipation, pain, and distention of the abdomen. The vomiting in a short time became unproductive of anything but mucus. Any attempt to swallow was followed by immediate regurgitation. The patient was brought

to the hospital on the fourth day of his sickness; at that time there was a large mass in the upper portion of the abdomen. Operation was undertaken and the anterior wall of the stomach was found lying over the mass. The latter, from its cystic feeling, was thought to be possibly a pancreatic cyst. It was punctured and a very large quantity of fluid was drawn off (about 4 litres). It then became evident that the whole mass was the stomach distended with fluid and that the pancreas was entirely healthy excepting, perhaps, for some enlargement. The stomach was found twisted about 180° on its axis and fixed in this position through adhesions, the pylorus and cardia being completely occluded. There was beginning peritonitis. The stomach was replaced in proper situation and retained its position without any artificial aid. The man became entirely well and remained so. The case is especially notable for the entire cure of fat necrosis by operation. The fat necrosis was probably due to pressure of the distended stomach upon the pancreas itself or upon its main duct. The cause of the volvulus seemed to be displacement of the colon above the stomach, so that the partial fixation which this organ normally gives the stomach was absent. When a partial volvulus had come to pass this was undoubtedly largely increased by the distention of the stomach with the fluid secreted into it in such large amounts.

Hæmatemesis in Intestinal Stenosis.—L. ATIXIER and C. VIANNAY (*Gazette hebdom. de Méd. et de Chir.*, 1900, No. 77) direct attention to the rarity with which hæmatemesis has been mentioned as a symptom of stenosis of the intestine; it is not commonly discussed among the causes of gastric hemorrhage. It is, nevertheless, not surprising that it does occasionally occur. In the case reported by the authors the patient was admitted with the signs of severe intestinal stenosis, which laparotomy showed to be due to adhesions in the ileocæcal region. These were overcome as far as possible and the patient improved temporarily, but after a few hours began to vomit again; the vomitus was black, had no fecal odor, and gave the characteristic reactions of blood. The patient died the next day after having vomited certainly as much as 2 litres of this black material within twenty-four hours. The stenosis was found to be about 50 cm. from the ileocæcal valve, the intestine being fixed by adhesions and almost completely stenosed. Masses resembling the vomitus were found in the upper portion of the small intestine, while normal feces were found in the lower part. In the upper portion of the small intestine there was severe congestion and there was a hemorrhagic suffusion at the point of stricture. The occurrence of the hemorrhage was explained chiefly by the blood stasis produced by the stricture, which had caused an intense congestion of the intestinal mucous membrane; the authors also consider that the irritation of the peritoneum had caused severe vasomotor disturbance, and that the toxic and inflammatory changes present had caused alteration of the vessel walls and of the blood. There was no sign of ulceration in this case, and the authors direct attention to the fact that hemorrhage has been seen in a number of similar cases in which no change was found in the intestine which directly localized the source of the hemorrhage. Hemorrhage in such cases makes the prognosis extremely bad. It indicates severe lesions as a result of the occlusion.

SURGERY.

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Treatment of Pott's Disease after the Development of the Deformity.
—BRADFORD and COTTON (*Boston Medical and Surgical Journal*, September
20, 1900) state that the treatment of Pott's disease may be divided into two
classes: (1) The treatment of the disease itself for the arrest and cure of a
pathological process, and (2) the treatment of the deformity—that is, its
correction or the prevention of its increase.   The treatment of the disease
itself consists in the proper fixation of the spinal column, either in a recum-
bent position in the acutest stage, or with thorough fixation and ambulatory
treatment in the subacute and convalescent stage—that is, as soon as the
slight jar unavoidable in locomotion may be permitted without fear of ill
effect.   The correction of the deformity : forcible correction has been
attempted in 639 cases, with deaths from the operation in 5 cases, and death
from some other cause in 20 cases.   The immediate results were respiratory
embarrassment in 7 cases, pain in 6 cases, and severe shock in 3 cases.
Abscess was present before the operation in 19 cases; ruptured in 4 cases.
benefited or absorbed in 6 cases, and appeared after operation in 2 cases,
Paralysis was present before operation in 23 cases, relieved in 17 cases,
not relieved in 2 cases, and made worse in 1 case.   Paralysis appeared after
the correction in 4 cases.   The direct effect on the deformity in 240 cases
was complete correction in 130 cases, incomplete in 94 cases.   The result in
77 cases was no relapse in 20 cases, some relapse in 50 cases, and total relapse
in 7 cases.   The amount of force that may be used with safety varies with
the amount of resistance and solidification of the affected bone.   Correction
treatment is admissible in the first of the stages only.   The methods that
have been employed in the correction by force are: (1) Vertical suspension
from the head; (2) vertical suspension by the head and arms; (3) horizontal
traction of the recumbent patient, with the pull upon the head, arms, and
legs; (4) the same, with downward pressure upon the projection and support
at the neck and hips, the patient lying upon the face; (5) traction with the
patient lying upon the back ; (6) downward pressure upon the pelvis and
upper portion of the trunk, with upward resistance at the back at the point
of maximum projection, the patient lying upon the back, with or without
traction to the head and feet; (7) the patient lying upon the back, with
upward pressure by means of a strap passed under the patient at the point
of greatest projection, connected with a cord and pulley ; (8) correction with

the patient seated, the upper portion of the trunk being stretched backward while the point of projection is passed forward at the knuckle and the pelvis secured by a strap. Experiments on the cadaver have shown that the correcting force to be preferred is that of pressure rather than traction, as the former is more precise in its effect upon the diseased tissue than a pulling force which is partly expended upon the secondary curves. A pulling force involves an unnecessary strain upon the neck and on the lumbar region which, when an anæsthetic is not employed, causes pain not essential to correction. A pressure force may be made to act more directly and with less waste. The method to be regarded as the best is that one in which the force applied can be more easily controlled by the surgeon and which can be employed with the least discomfort to the patient. That also is to be preferred in which the retaining jacket can be applied to a spine held in a corrected position with the least discomfort to the patient and the greatest facility to the surgeon. After correction of the deformity it is necessary to retain the spine in a corrected position until the gap made in correction is regained or supported by ankylosis. A retention appliance is quite as important as the correction itself, and it is necessary that careful fixation in a corrected position should be carried out for a long period. When correction is not possible for various reasons, either on account of the situation of the curve or on account of the pathological condition, the treatment by fixation of the trunk with appliances is to be employed, with the hope of arresting the development of the curve. The retention of the spinal column in the best possible position is, therefore, always important, even if correction has been attempted. When fixation treatment is neglected, even if satisfactory correction has been attained, a relapse of the curve will follow. After the tubercular process in the spinal column is arrested and complete bony ankylosis has occurred, it will sometimes be found that an increase in the curve may take place in the course of the growth of the child. This is not due to a continuation of the tubercular process, but to a change in the shape of the vertebræ, caused by the abnormal direction of superimposed pressure. The extent of these secondary curves and their development depend upon the rate of growth of the child and the amount of superimposed weight rather than upon a condition of osteitis. In order to overcome this it is necessary to continue the use of the mechanical appliances longer than the pathological condition would seem to demand. It has been shown that the main support in the diseased spinal column is in the articular processes. When these are welded together in connection with an ankylosis of the transverse and spinous processes, nature has furnished the most desirable support to a spinal column with diseased vertebral bodies. Attempts to promote solidification of these tissues naturally suggest themselves, but there can hardly as yet be said to be an established method of treatment. It may be said, in conclusion, that the correction or rectification of the curve in Pott's disease is to be considered in every case of active disease with a deformity. The employment of force should depend on the pathological conditions and not on the extent of the curve. Force should be used with great reserve. Improvement of the curve is to be considered in every case, and is to be attempted wherever the spinal column can be made straighter without great force. The main dependence, however, for an ultimate suc-

cess remains in the surgeon's careful, continued, and thorough employment of retention appliances which hold the spine in the straightest possible position for a sufficient length of time for consolidation of the diseased bony structures. Success is to be won more by careful attention to detail than by operative procedures.

Conservative Operations in Renal Retention.—KUSTER (*Thirteenth Int. Med. Cong. Résumé.* August, 1900) makes the following summary of his views :

1. There are two forms of renal retention.

a. Primary retention, the sacculated kidney, cystonephrosis.

b. Secondary retention, the empyema of the kidney arising from a pyelonephritis. It is unnecessary to speak of these, as they all require radical operation.

2. The name "sacciform kidney" comprehends all primary forms of retention due to the hindrance of the flow of urine without regard to their contents. This may be watery, urinous, purulent, viscid, or pasty. It is inconvenient to give to each of these a name, for they really comprise but one disease—cystonephrosis, of which certain varieties may have the names pyonephrosis, ureonephrosis, etc.

3. The cause of the obstruction is situated in the ureter in all but a few exceptional cases. The most frequent seat of obstruction is in the upper third, and for this reason operative intervention should usually seek this point.

4. Renal retention should be treated conservatively, *i. e.*, with the preservation of the kidney, even when the other kidney is known to be intact.

5. The conservative methods can be divided into four groups :

A. Fixation of a movable kidney (nephropexy, Guyon). It is often necessary to combine this simple operation with others, as detachment of the ureter or plastic operations.

B. Formation of anastomoses between : 1, ureter and ureter ; 2, pelvis and ureter ; 3, pelvis and bladder.

These operations are satisfactory only when no dead spaces are left which may determine the formation of urinary calculi. Without such precautions the results are worthless.

C. Plastic operations with or without resection of the ureter.

1. Pyeloptychie (J. Israel).

2. Division of the valve and suture (Fenger).

3. Simple resection of the stricture and ureter. This should always be oblique, as this method is less liable to be followed by stenosis than the transverse.

4 Uretero-pyeloneostomy by the method of Trendelenburg and Küster.

D. Partial resection of the kidney.

a. Resection of the renal pelvis followed by suture (Albarran).

b. Wedge-shaped resection of the kidney parenchyma in cases of horseshoe-shaped kidney.

FENGER (*Ibid*) summarizes his views on the subject as follows :

Remittent or beginning retention (and all retention is, in its early stages, as a rule, remittent) is a condition in which we should always consider the possibility of saving kidney tissue by re-establishment of the free passage of urine.

The obstruction may be located in the calyces, in a branch of the ureter, in the bottom of the pelvis, or origin of the ureter, or in the ureter.

Obstruction in the first two locations causes a local or partial cystonephrosis, and demands, for the relief of the condition, bisection of the kidney from its convex surface, and division of the partition walls.

Stenosis at the exit of the ureter (valve-formation, oblique implantation from unilateral dilatation) requires operations which vary in accordance with the absence or presence of stricture at the upper end of the ureter.

If there is no stricture at the upper end of the ureter, the valve-formation may be overcome by a trans-pelvic operation (Fenger, Mynter, Trendelenburg, Küster), or by the extra-pelvic operation, which he prefers.

If there is a stricture of the ureter at its exit from the pelvis, as may be expected in infected cases, we may resort to extra-pelvic plastic operation (Fenger), or to resection of the strictured end of the ureter, implantation of its upper divided end into the pelvis (Küster).

If the stenosis or obstruction is located in the ureter, it must be dealt with according to laws laid down for surgery of the ureter, namely, resection and re-implantation, or his plastic operation.

Are the results of these, so to speak, tentative conservative operations permanent, or does relapse eventually occur?

In five of his cases no relapse occurred.

1. Valve formation, transpelvic operation, no relapse six years later.

2. Stricture, upper end of ureter, extra-pelvic operation; no relapse six years later.

3. Valve-formation of lower branch ureter, extra-pelvic operation, bisection of kidney, division of partition walls; no relapse after three years.

4. Excision of valve in ureter by author's plastic operation; no relapse after three years.

5. Stone in upper end of ureter, removed by the author. One year later, plastic operation on the ureter by another surgeon. Six months later, complete occlusion of ureter at site of second operation; author's plastic operation; no relapse after one year.

In two cases relapse occurred:

1. Valve-formation without stricture, intra-pelvic operation, relapse of stenosis, occlusion of pelvic orifice; nephrectomy one year later

2. Patient operated on by another surgeon, later on by the author; operation was incomplete, failed, and nephrectomy was finally necessary.

BAZY (*Ibid.*), in discussing the same subject, defines the condition of renal retention as the constant presence of urine in the pelvis or calyces of the kidney, which is the result of an interference with its flow. The obstruction may be found anywhere between the origin of the ureter in the pelvis of the kidney and its vesical insertion, or it may be due entirely to a vesical cause.

The obstructions of the ureter, which alone are considered, are found anywhere in its course, and consist of strictures, twists or vicious insertions, and calculi.

1. Twists are generally, if not exclusively, found in the upper third of the ureter. They are associated with movable kidney and vicious insertions of the ureter in the renal pelvis.

2. Calculi may be found anywhere in the ureter, but the point of election is at one or other extremity.

3. Strictures may be found at all points of the ureter, but they are more frequently above or below.

These strictures may be due to lesions of the ureteral wall or to inflammations of neighboring organs and cicatricial tissue forming there and by its contraction, producing the stenosis.

Such strictures are always present in cases of uretero-vaginal fistula—an important point.

Renal retention may be intermittent, remittent, or continuous. The first two are due to vicious insertion and movable kidney or a calculus. Continuous retention, or even permanent, is caused sometimes by calculi, but more commonly by strictures, the action of which is progressive and permanent. The final stage is a hydronephrosis or pyonephrosis.

Finally, the retentions may be aseptic or septic. The aseptic are hydronephroses. The septic are the infected hydronephroses or pyonephroses.

Conservative operations are indicated only when the kidney has functional utility and is not a source of danger. The indications are most exact in pure hydronephroses, they are less clear in cases of infected hydronephrosis, they are absolute in cases of unilateral kidney, no matter what the condition.

The treatment varies with the condition. Calculi should be removed by nephrotomy, ureterotomy, or by vesico-ureteral or vagino-ureteral operation. Twists heal spontaneously or by nephrorrhaphy. Abnormal implantations are operable by uretero-pyeloneostomy. These operations are primary and secondary, depending on the presence or absence of infection. There are various methods that differ slightly from one another. Resection of the renal pelvis should be confined to pure hydronephroses without infection. Aseptic operations may be done by either route. Septic operations (pyonephroses) should always be done by the lumbar route.

In all cases it is absolutely essential to overcome all strictures.

Infection of the ureter and renal pelvis is not a contraindication to operation. Abscess of the kidney is, however, a contraindication to all anaplastic intervention.

The results of the past seven years justify these conclusions.

Experimental Injection of Testicular Fluid to Prevent the Atrophy of the Prostate Gland in Dogs after Removal of the Testes.—WALKER (*Bulletin of Johns Hopkins Hospital*, December, 1900) states that it is now a well-known fact that the prostate gland undergoes an atrophy after the removal of the testes, and these changes have been most accurately studied by several investigators, whose observations the author has confirmed in several instances. These may be summarized thus: Twelve days after the removal of the testes there can be seen a beginning change in the epithelial cells of the prostate gland; the protoplasm first begins to clear up and the nuclei lose their chromatin structure and diminish in size. Following this the protoplasm becomes gradually less and less, and finally at the end of about six weeks it presents only a faint rim around a small, deeply stained nucleus. The bloodvessels, which at first were large and turgid, very soon begin to shrink, and finally many of them are obliterated; the muscle

undergoes fatty degeneration and is ultimately converted into or replaced by fibrous tissue. After a period of from eight months to one year the gland is reduced to about one-fourth its normal size; the glandular structure is represented by only a few small tubules lined by shrunken and quiescent cells, and the remainder of the gland is converted into fibrous tissue. The result may be summed up in a few words: The prostate gland in the infected animals presented both macroscopically and microscopically the same changes that had occurred in the uninjected ones. It may be said, therefore, that the injections of the testicular fluid had apparently no effect whatever, and one is probably justified in concluding that the atrophy of the gland is in no way connected with the absence of any substance in the testicular secretion.

Cholelithiasis from the Surgical Point of View.—SMITH (*Buffalo Medical Journal*, January, 1901) states that it is known that the colon bacillus is pus-forming, and under favorable circumstances, especially when mechanical interference with the biliary flow arises, it may lead to suppurative cholecystitis and empyema of the gall-bladder. Other infectious organisms, according to recent investigations, are found to lead to pus formation in the biliary tracts. When local conditions or the character of the bacteria lead to an infection of the catarrhal inflammatory type in the bile tracts, suppuration does not take place, but the deposit of cholesterin and bile salts about a focus of bacterial activity leads to gallstone formation. The colon bacillus and the typhoid bacillus have lately been found by numerous observers as the basis of biliary calculi. When we consider cholelithiasis from this pathological point of view the treatment is put upon a broad surgical plane that leaves to internal medicine the close study of the subject from the diagnostic stand-point with a view to the course to be followed in treatment. Treatment should be pursued along medical lines after diagnosticating cholelithiasis to the point of determining that its manifestations are threatening to the patient from the element of sepsis, or of mechanical interference with the biliary flow, or the conjunction of these two elements. Internal medicine should then call upon surgery to drain for sepsis and to afford mechanical relief to mechanical interference with the biliary current. In conclusion, it seems that the indications for operative treatment of cholelithiasis can be summed up under two headings: In the first place, operate for biliary calculus obstruction along the bile tracts, which has in its train of sequelæ recurring colic, hydrocholecyst, persistent jaundice, and cholæmia; in the second place, operate for sepsis of the bile tracts when it develops such dangerous conditions as suppurative cholangitis, suppurative cholecystitis, or perforation of the duct or cholecyst. In both classes of cases suffering and death are to be dreaded, in the majority of cases more from the disease and its sequelæ than from the surgeon's knife.

A Contribution to the Diagnosis of Suppurative Appendicitis.—ROBINS (*Medical Record*, October 27, 1900) states that a white blood-count will often swing the pendulum in the direction of the diagnosis of one disease or another. Especially is this true in cases of suppuration complicating an infectious or inflammatory disease. Thus a sudden hyperleucocytosis in the

course of typhoid fever will point to a complication, and if accompanied by a sudden onset of pain in the abdomen will be a sufficient justification for an exploratory incision. A hyperleucocytosis will at once differentiate a suppurative appendicitis from simple colic, typhoid fever, ovarian neuralgia, impaction of feces, and floating kidney. Developed during the course of a catarrhal appendicitis it will point to suppuration with as much precision as any of the diagnostic signs in our possession. The following cases of appendicitis show the relation of suppuration and hyperleucocytosis:

No. 1. 52,000 leucocytes; pus formed on operation.
No. 2. 19,000 leucocytes; pocket of pus found.
No. 15. 22,300 leucocytes; abdomen full of pus.
No. 17. 21,900 leucocytes; pus; cæcal abscess.
No. 18. 47,700 leucocytes; second operation; pus.
No. 18. 30,300 leucocytes; third operation; pus.
No. 23. 20,000 leucocytes; operation; pus.
No. 28. 19,000 leucocytes; purulent peritonitis.
No. 31. 17,500 leucocytes; pint of pus.
No. 34. 16,200 leucocytes; abscess cavity.
No. 40. 32,800 leucocytes; large amount of pus.
No. 50. 17,000 leucocytes; pus.
No. 54. July 6th, 11,800 leucocytes; slight tender-
    ness, no resistance or dulness.
No. 54. July 7th, 19,000 leucocytes; resistance and
    tenderness; operation, pus.

The last case shows how by means of a blood-count pus can be detected in twenty-four hours and a fatal case be thus converted into a very favorable one, and it appears rational, therefore, that a frequent blood-count in cases of appendicitis is almost an imperative necessity.

The Importance of Early Operation in Gallstones.—RICHARDSON (*Journal of the American Medical Association*, December 1, 1900) states that gallstones should be removed from the gall-bladder as soon as their presence is reasonably sure unless the diseased condition of the other viscera makes the hazard of the operation greater than the hazard of the gallstones themselves. The author has observed that the earlier the operation the less danger and the greater success. The removal of gallstones from a normal gall-bladder is without mortality, and he has yet to lose a case after the simp'e removal of gallstones from a normal gall-bladder. Operations on the cholæmic are attended by a relatively high mortality. In this class of cases the operation has often to be performed on the common duct, where the dissection is broadest and deepest and the patient's power of resistance feeblest. The significant and unfavorable factor, however, is the jaundice and not the dissection, for an even larger percentage of deaths has followed simple exploration for malignant disease blocking the biliary passages than has followed simple operation for gallstones in prolonged jaundice. All of the author's cholecystotomies have been successful. The fatal operations of this class have been cholecystotomies with removal of stones from the hepatic and cystic ducts through the gall-bladder. Considering the gravity of the acute infections of the gall-bladder, this class of cases has been

most brilliant, for nearly all the patients have recovered after simple drainage. The results of experience can but emphasize the importance of early operations. In most of the author's fatal cases the history of gallstones had lasted over many years—a period of time during which serious complications, both local and general, had taken place. Moreover, in many cases the patients were beyond middle life, and one patient at least was of advanced age. Among the deaths were four occurring during the course of an acute cholecystitis. In some of the successful cases, too, similar serious local and constitutional conditions existed, but in spite of them recovery followed. Patients of middle age, or younger, without these complications were all cured by operation, and thus far the cure has been permanent. Among the serious complications were acute infections of the gall-bladder in some twenty cases. All recovered except four. In many of them there was no history of gallstones; in several appendicitis was supposed to exist; in a few no gallstones were found; in two the operation was undertaken as a last desperate hope. The possibility of the occurrence of acute cholecystitis is another strong argument in favor of early operation. Though comparatively rarely seen in the acute stage, the author is sure that many of the contracted gall-bladders have passed through successive mild infections.

What are the indications, then, for operations on gallstones? In the author's opinion, the indication is the diagnosis of gallstones in the gall-bladder. When this diagnosis has been made the gall-bladder should be explored if there is no contraindication in other viscera. A single attack of gallstone colic after which a faceted stone is found in the stools indicates operation, but a single attack after which a single non-faceted stone is found does not. Repeated attacks of severe colic, even if stones are not found in the stools, strongly indicate exploration, especially if there is tenderness in the gall-bladder, with fever, for stones are probably confined in the gall-bladder or at its outlet, and the spasms are ineffectual efforts of the gall-bladder to expel them. All cases of acute cholecystitis demand operation if seen early unless the symptoms are rapidly improving, and then they require operation after the subsidence of the acute attack. Repeated attacks of gallstone colic indicate operation, even if no stones are discovered in the stools and even if the symptoms are so mild as not to demand it. True conservatism in the surgery of the gall-bladder—the lesions of which are purely mechanical—requires, as the only rational treatment, surgical measures which themselves are purely mechanical. Though natural relief in gallstones is not as impossible as in stones of the urinary bladder, the former, because of their occurrence, cause far more suffering and death than do the latter. Furthermore, the complications of gallstones are in many instances quite as disabling as those of urinary calculi, and they often are more rapidly fatal. A most pernicious argument against surgical measures in gallstone affections, as in appendicitis, is the occasional quiescence or apparently complete recovery after severe symptoms, but one can never predict the probable course. Removal of the appendix that has offended or is offending is the only common-sense method of treatment, as most experienced operators and clinicians will admit, the chief difference of opinion being as to the safest time for operation; so in patients who have suffered from gallstones—who are suffering

from them—it is but common-sense to advise simple and safe methods of sure removal rather than the uncertain and dangerous courses of natural evolution. In both diseases early operation, at a period when everything favors speedy convalescence, can but be regarded, in the light of experience and of common-sense, as a life-saving procedure gained at a minimum of risk.

PEDIATRICS.

UNDER THE CHARGE OF

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AND

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A Comparison of Drug Values in the Treatment of 752 Cases of Pertussis.—CHARLES G. KERLEY (*Proceedings New York Academy of Medicine, Section on Pediatrics,* February 8, 1900 ; *Pediatrics,* May 1, 1900) presented a paper under this title. The cases were separated as they developed into groups of twenty, and were allowed to cough without treatment until the height of the paroxysmal stage was reached, which usually required from ten to fourteen days. Five-sixths of the patients were under four years of age, and one-half under two years. The duration of the attack had varied between three and twenty weeks, the usual duration having been between six and eight weeks. Resorcin and boric acid with sodium bicarbonate were tried by insufflation in six institution cases, but were discontinued after three days. Alum, fluid extract of horse-chestnut leaves, dilute nitric acid, cocaine, bromoform, bromides, belladonna, and antipyrine had all been tried. The first three had been found valueless ; alum appeared to be of some service, but had been badly borne by the stomach ; bromoform had proved very unreliable. Cocaine in doses of one-tenth of a grain every four hours for a child of two years had been employed in about twenty-five cases. It had controlled the severity of the paroxysm somewhat, but not sufficiently to warrant its continuance.

Quinine in large doses (twelve to twenty grains daily) had produced great benefit, the number and severity of the paroxysms being remarkably controlled and diminished one-half or one-third. Belladonna had been used in sixty cases, pushed to its physiological effect, but no beneficial effects had been observed. Twelve to sixteen grains a day of a mixture of equal parts of the bromides of sodium, ammonium, and potassium, at the age of one year, gave better results than were obtained with the previously mentioned drugs.

Antipyrine had been used in sixty cases, and had controlled the paroxysms better than any other drug employed, and caused only a trifling depression if

administered with ordinary care. The combination of bromides with anti-pyrine had been used in sixty cases, with better results than from one or other of these drugs independently. For a child of eight months half a grain of antipyrine and two grains of sodium bromide should be given every two hours for six doses, and then its administration should be discontinued for twelve hours before being resumed. For a child between two and a half and four years of age, two grains of antipyrine and three or four grains of bromide should be given every two hours for twelve hours, and then discontinued for twelve hours before being resumed. The steam spray and fresh air were also useful adjuncts to the drug treatment.

Treatment of Pertussis by Oil of Gomenol.—LEROUX and PASTEAU (*Le Bulletin Médical*, June 13, 1900) speak favorably of the use of an oily solution of gomenol, which is an essence obtained by distillation from a variety of melaleuca viridiflora, grown in New Caledonia. From 5 to 10 c.c. of a 5 per cent. oil were injected into the gluteal muscles. The results of treatment in forty cases were generally favorable, the frequency and severity of the paroxysms being shortened and the duration of the disease reduced on an average to twelve to fifteen days. Treatment should be continued for four or five days after the last seizure.

The Acute Non-tuberculous Meningitis.—A very complete report upon this subject was recently made by CONCETTE, of Rome, to the Thirteenth International Medical Congress (*Revue mensuelle des Maladies de l'Enfance*, August and September, 1900, p. 394, and November, 1900, p. 550). It is based upon ninety cases of non-tuberculous meningitis and upon thirteen cases of poliomyelitis, most of which were exhaustively studied. Autopsies were obtained in twenty-two cases, and fifty other cases of various conditions, such as hydrocephalus, tuberculous meningitis, cerebral and rhachidian tumors, tetany, etc., were studied by way of comparison. At least 450 lumbar punctures were made. The conclusions of this very important study are worthy of attention :

1. A series of twenty-three cases of acute meningitis. These developed most often in the course of a gastro-intestinal infection or of a pneumonia or other acute infectious disease, more rarely in the midst of perfect health. They are characterized by an abundant exudation of cerebro-spinal fluid of limpid clearness and increased specific gravity, which is richer in albumin than normal and sometimes shows the formation of a fibrinous reticulum (the phlogistic exudate), but contains no trace of micro-organisms. The exciting cause is attributed to toxic elements. The term acute serous meningitis should be restricted to cases of this character.

2. In another series of twenty-one cases the meningitis most frequently developed primarily or, more rarely, in the course of another disease (pneumonia, intestinal infections, or typhoid) and was caused by various known organisms. The cerebro-spinal fluid may be perfectly limpid, clouded, or even purulent, and contains a much higher proportion of albumin than normal—1 to 2 per cent. At autopsy the meninges are scarcely affected, or may show varying degrees of fibrinopurulent exudate, which in the extremest cases may be very extensive and thick. Limpidity of the liquid

exudate in these cases does not justify the term acute serous meningitis, which should be reserved for the purely toxic cases of the first group. The most frequently encountered micro-organisms are the pneumococcus and the diplococcus intracellularis (meningococcus), but in rarer cases have been found the bacterium coli, the Eberth bacillus, streptococci, staphylococci, the bacillus pyocyaneus, the bacterium lactis aërogenes, or others. With the exception of the streptococcic or staphylococcic cases, in most of these meningites the cerebro-spinal fluid is limpid. The cerebro-spinal fluid does not furnish a good culture medium for micro-organisms, especially the meningococcus, which tends to die out and disappear. The pneumococcus determines the most serious and rapid cases, especially if it coincides with pneumonia (metapneumonic meningitis), but it may determine primary meningites of the same type. It is only exceptionally that benign forms are encountered.

3. Meningites produced by the meningococcus are almost always primitive (perhaps of nasal origin), have a much longer course, are almost always of intermittent type, and have a tendency to recovery in the majority of cases. The varieties of the meningococcus which have been described (Weichselbaum, Jäger-Heubner) are only modifications produced by varied conditions under which they develop.

4. Acute meningites, whatever their nature, which do not destroy rapidly (excepting the exceedingly benign forms), tend to a prolonged course lasting several months or even as long as a year, especially those due to the meningococcus, and may terminate in death in a profound state of atrophy, or in recovery which in most cases is incomplete, leaving as a result hydrocephalus, amaurosis, deafness, or various palsies.

5. All the causes above considered, whether bacterial or toxic, may act in the same manner upon the nervous tissue itself, or upon it at the same time as upon the meninges, and produce polioencephalites, poliomyelites, or meningomyelites, which should be considered as processes due to the same pathogenic cause, distinct only in special cases because of the quality of the causal element and of the localization.

6. Lumbar puncture constitutes an excellent means of diagnosis and sometimes of prognosis. It is also a powerful therapeutic agent if practised at an early period of the disease and continued with more or less frequency according to the gravity of the case. Under these conditions puncture seems to prevent extreme prolongation of the course and unfortunate sequelæ.

7. On the contrary, in other forms—e. g., tuberculous meningitis—puncture is useless either for diagnosis or as a therapeutic measure. The same may be said for its use in chronic congenital hydrocephalus and cerebral tumors. Good results, however, can be obtained in tetany, hemorrhachis, and, according to some authors, in chorea.

Indications for Lavage of the Stomach in Nurslings.—HEUBNER (*Revue mensuelle des Maladies de l'Enfanee*, November, 1900, p. 575) defines the indications for lavage of the stomach in the gastro-intestinal diseases of infancy. Under certain conditions this procedure produces little or no effect, as, for instance, with chronic gastro-intestinal lesions associated with

more or less pronounced athrepsia. Here lavage of the stomach gives no appreciable results, for it can combat only one of the many factors which enter into the case. The same may be said of cases of acute dyspepsia which begin not with gastric, but with intestinal symptoms, such as colic, meteorism, and green stools. Evacuation of the stomach cannot eliminate the harmful substances, and the same may be said of cases in which there is a grave inflammatory state of the large or small intestine.

Quite different is a condition of acute indigestion encountered in artificially fed children suddenly seized with repeated vomiting, anorexia, and signs of collapse, since in these cases there exists frequently a certain sluggishness of the stomach preventing the onward passage of the food. The intestine is protected, for some hours at least, from infection by the decomposing stomach contents, so that evacuation of the stomach by means of the tube, with subsequent lavage, brings about a rapid cure and prevents intestinal disturbance. These conditions in the infant constitute the chief indication for lavage of the stomach. Neither emetics nor purgatives are by any means so satisfactory; the former add to the general depression and the latter favor the progression of decomposing food into the intestine.

In the technique two precautions are necessary: the fluid used should always be a physiological solution of sodium chloride or a solution of sodium bicarbonate of the strength of 0.7 per cent., appropriately warmed. Pure water should never be employed, since it acts unfavorably on the epithelium of the stomach. The pressure should not exceed that of a column of water 20 cm. in height.

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The Abortive Treatment of Pneumonia in Infants and Children.—H. ILLOWAY, of New York (*Pediatrics*, December 15, 1900, p. 442), asks the question, Can a pneumonic process in the infant or child be arrested at its outset—aborted? He then refers to the old-fashioned theory of jugulation, which held an important place in the practice of physicians of the past generation. From his own experience he answers the question affirmatively and proceeds to report a number of cases of both catarrhal and croupous pneumonia bearing out his statement. The first case was one of bronchopneumonia in an infant, aged nine months, which began after a bronchitis, with slight fever, lasting five or six days. The temperature then rose and for two days ranged from 102° to 102.75° and from 103° to 104°. On the morning of the third day, with a temperature of over 103°, considerable diminution of resonance in the right lower lobe posteriorly was detected. The child lay in a stupor, from which it was aroused only by cough. At this stage of the disease three-fourths of a drop of tincture of veratrum viride and one-fourth of a drop of tincture of aconite were given every hour and a half. By evening the temperature had fallen to 100° and the baby had begun to nurse well. Next morning the temperature was normal and rapid recovery followed; the cough continuing for ten days longer, growing less and less frequent and at the end of that time ceasing altogether. The second case occurred in a girl, aged eleven years, in whom the author had observed two previous attacks of bronchopneumonia, both of which lasted for more than three weeks. At the third attack the physical signs gave promise of more extensive involvement of the lung than occurred in either

of the two preceding attacks. The treatment here was the administration of three-fourths of a drop of Norwood's tincture of veratrum viride, with one-fourth of a drop of tincture of aconite, given at intervals of half an hour for five doses and then hourly. This dosage was continued from morning until evening, and by this time the child was so much better that the interval was made every two hours, and during the night the medication was omitted. On the following day the temperature was normal. All signs of bronchitis disappeared in seven days. Two other cases—one of bronchopneumonia, the other distinctly croupous—were treated successfully in the same way.

A second class of cases is described in which the infusion of digitalis (a decoction as prepared by German pharmacists, 10 grains to the ounce) seemed to act satisfactorily.

The author believes that the combination of aconite and veratrum viride acts directly upon the main factors in the morbid process—congestion and inflammation—as shown by the fact observed that the temperature was reduced permanently without subsequent rise even after the medicine was stopped. He considers the repetition of the remedies at short intervals to be of the utmost importance.

[It is a well-known fact that pneumonic processes in the child often terminate spontaneously after a course of only two or three days, so that conclusions based upon only a few cases, however treated, must be accepted with caution. Dr. Illoway's cases, however, are very suggestive and at least indicate that this combination of drugs can be used without harmful results. One of the editors of this department has frequently employed at the outset of pneumonia in children a combination of tincture of aconite and tincture of digitalis during the first twenty-four hours, with very encouraging results, which lend support to Dr. Illoway's contention.—T. S. W.]

THERAPEUTICS.

UNDER THE CHARGE OF

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Urotropin as a Urinary Antiseptic.—DR. P. J. CAMMIDGE has given very careful study to the action of urotropin in the urine, especially in relation to its antiseptic action on the bacillus coli communis, the bacillus typhosus, and pyogenic cocci. He finds that in strong solution it is markedly toxic to the typhoid organism and less so to the colon bacillus and staphylococcus; in weak solution it inhibits growth only. The causes for

its antiseptic action were investigated, with not altogether definite results. It has been supposed that it breaks up into formaldehyde, but on this point the experiments are summarized as follows: (1) Urotropin alone by prolonged heating may be made to yield formaldehyde, but this decomposition does not take place at body temperature; (2) an alkaline solution of urotropin may be similarly decomposed, but the body temperature is not sufficient to cause the change; (3) dilute acids quickly decompose urotropin on boiling, with the evolution of free formaldehyde, and this change occurs to a slight degree at the body temperature; (4) acid salts—e. g., of the urine—liberate formaldehyde from urotropin on boiling, but not at the normal body temperature; (5) the acid urine of a person taking 2 grammes (30 grains) of urotropin a day does *not* contain free formaldehyde. There is no doubt that there is an antiseptic in the urine, but it is evidently not free formaldehyde. It is possible that a new compound is formed with acid urine. Typhoid cystitis, suppurating pyelitis, and pyelitis from calculus, as well as simple colon infection of the bladder, are happily acted on, but gonorrhœal and tuberculous cystitis do not seem to be benefited. In using urotropin it is essential that the urine be rendered acid.—*Lancet*, 1901, vol. clx., p. 176.

Cobra Poisoning Treated with Antivenene.—Drs. W. Hanna and George Lamb, working in the Bombay research laboratory, report an instructive case. One of them was bitten, during experimentation, by a full-sized cobra and an appreciable amount of venom thrown into the operator's thumb. Local treatment was confined to sucking the thumb freely. Twenty minutes after the accident 4 drachms of Calmette's antivenomous serum were injected, half into each flank. This serum was four or five years old, and experiments made on rats a few weeks previous showed that it possessed one-fourth of its normal neutralizing power. Two and one-half hours after the patient was bitten symptoms of cobra poisoning set in; these were, at first, disinclination to work and lethargy, then followed nausea and vomiting, accompanied by slight paresis of the legs. Fresh serum was then obtained and two teaspoonfuls used. The nausea and the weakness of the limbs continued for some time, and at the expiration of about five hours all symptoms had passed away. The favorable result is attributed to the use of the serum even after general symptoms had made their appearance.—*Lancet*, 1901, vol. clx., p. 2.

Selenium as a Toxic Agent.—Drs. F. W. Tunnicliffe and O. Rosenheim speak of the difficulties in the way of ascribing all of the cases of neuritis in the recent Manchester epidemic to the action of arsenic and suggest that perhaps selenium, which is highly poisonous and an invariable accompaniment of pyrites, is responsible for some of the symptoms. Its part, however, is purely subsidiary to that played by arsenic.—*Lancet*, 1901, vol. clx., p. 318.

Arsenical Poisoning in Beer.—Dr. W. B. Worringdon makes some comments on symptoms seen during the epidemic of arsenical neuritis in Manchester. Sensory disorders seem to have been out of all proportion to

the amount of beer or stout consumed. The most obtrusive phenomena were : (1) Numbness and tingling, which came on rapidly, in both hands and feet. In some a painful sense of a burning character in the soles of the feet, making walking undesirable, was all that was noted. (2) Pain, often most acute on pressing the soles of the feet, especially at the heel and ball of the great and little toe. In nearly all cases the pain on moving the joints was excessive, and especially so on pressing the muscles; this latter symptom was also noted in a number of cases in the forearm muscles. (3) Several of the patients showed a flushed appearance of the sole, especially at the great toe and heel, rarely spreading on to the dorsum of the foot, and associated with pain, making the picture of erythromelalgia, but the swelling, which when associated with pain and redness is described as typical of erythromelalgia, was seen in but one case. (4) Objective impairment of sensation was absent. (5) The knee-jerks were often present and at times unusually brisk.—*British Medical Journal*, 1901, No. 2088, p. 10.

Toleration of Arsenic.—Some observers have maintained that it is possible that the picture of arsenical poisoning from beer at Manchester was a trifle overdrawn, and DR. R. W. MACKENNA, of Liverpool, has collected a series of statistics from the Liverpool Skin Hospital bearing on the tolerance of arsenic in which he shows that, for Donovan's solution at least, patients can take 0.409 grain of arsenous iodide daily for months without untoward effects. According to these figures, an ocean of Manchester beer would have to be consumed in order to induce toxic effects. The arsenic eaters of the Tyrol are classical proofs of the toleration which may be enjoyed. It may be that the combination of arsenic and alcohol has a particularly pernicious effect, either as a result of their combined toxic actions, or because of some chemical interchange between the menstruum and the salt whereby the toxicity of the latter is increased.—*British Medical Journal*, 1901, No. 2089, p. 85.

Treatment of Rheumatic Fever.—DR. ARTHUR P. LUFF, as a result of his experience, believes that rheumatic fever is most successfully treated by giving an alkaline bicarbonate in combination with a salicyl compound. Twenty grains of sodium salicylate and 30 grains of potassium bicarbonate should be given every two hours until the pain is relieved and the patient is fully under the influence of the drug, when the same quantities should be given every four hours until the temperature has become normal. Later, 15 grains of the salicylate and 20 grains of the bicarbonate should be given every four hours until all joint symptoms have disappeared and then three or four times a day until two weeks have elapsed. Absolute rest in bed must be enforced throughout. The statement is made that larger doses of the natural salt than of the synthetic product can be borne by the patient, hence the natural salicylic acid should be specified. If the sodium salicylate is not well borne, salicin may be employed advantageously. If after the expiration of twenty-four to thirty-six hours the joints are painful, small blisters applied above and on either side of the joint will, as a rule, rapidly remove the pain and the swelling. Tincture of iodine about the joint is also recommended. The use of oil of wintergreen—methyl salicylate—is still

more efficacious as a local application. For the relief of general pain, opium, as Dover's powder, or the newer analgesics, phenacetine, etc., may be employed. Brandy is indicated as a heart stimulant, being especially important in cases complicated with endocarditis, pericarditis, or myocarditis. Especial stress is laid on the fact that the disease is rarely cured within four or six weeks, and hence great care must be exercised by the attending physician that the patient, relieved of pain, is not permitted to move about. The patient has latent rheumatism, and even the mildest exercise is apt to induce a relapse, which is usually attended with cardiac complications. This caution is to be particularly observed in treating children. The probability of mild cardiac involvement in almost every case should be borne in mind, and hence the heart should receive careful attention. Opium is of great value in the early stages of endocarditis or myocarditis or pericarditis, and strychnine and ammonium carbonate seem more available than digitalis when there is dilatation and failing cardiac power. Ice-bags, leeches, and opium are trustworthy remedies for pericarditis. Hyperpyrexia seems to be less prevalent under modern methods of treatment, but in those that do not respond to the salicylates, hydrotherapeutic procedures are advisable.—*Practitioner*, 1901, vol. lxvi., p. 64.

Treatment of Pneumonia.—DR. THOMAS R. BROWN, after a short review of the various shifting modes of treatment of this disease, says that the failures of the past should not be forgotten, and that no line of treatment should be followed in which the good does not definitely outweigh the bad. Pneumonia is not a disease of the lung solely, but also a general toxæmia, and thus in discussing the subject the possibilities of direct and indirect treatment should be considered. The early work of the Klemperers gave much encouragement to the hope of the probable efficacy of an antitoxin; thus far, however, the results have been problematical, but the attitude at the present time is promising. As to the advances along the indirect or symptomatic mode of treatment, the author believes that the best results are obtained by careful nursing, diet, hygiene, and by the systematic use of hydrotherapeutic measures during the entire course of the disease, cold sponging and cold packs being more practical than the full tub. Saline infusions are to be employed in the patients who have faint heart sounds and a weak pulse. One or two pints should be used. Inhalations of oxygen or medicated oxygen vapors are valuable in extreme cases. Morphine for pain, alcohol and strychnine for stimulation, are the most reliable drugs. Caution should be taken that thorough disinfection of the sputum is carried out.—*Maryland Medical Journal*, 1901, vol xliv., p. 1.

Treatment of Arsenical Neuritis.—DR. JUDSON S. BURY, of the Manchester Infirmary, has had exceptional opportunity to see numerous patients by reason of the recent epidemic of arsenical poisoning at Manchester. Heretofore some seventy to eighty cases were on record, but this epidemic affected thousands. In the treatment followed at the Infirmary the absolute withdrawal of the cause—beer—was enforced, both because of the arsenic and the alcohol. Rest in bed is advisable. Massage is distinctly contraindicated. For the relief of the pain hot fomentations are excellent. These are

best applied intermittently—a fomentation being placed on the affected part for one-half hour and then re-applied after a lapse of four hours. Vapor baths are of value if the heart's action is not affected thereby. Potassium iodide and the salicylates, alone or in combination, are effectual, and the newer analgesics, antipyrine and phenacetine, are valuable in many cases. Strychnine should never be used in the acute stages. The importance of careful nourishment was demonstrated forcibly. Boiled milk, beef-tea, beef extracts, broths, and soups are valuable. Peptonized foods are indicated for gastric irritability, and at times are nutrient. Enemata are necessary. After the acute stage is over massage, electricity, and tonics are efficacious. Cod-liver oil and strychnine are useful, but arsenic is to be avoided.—*British Medical Journal*, 1900, No. 2084, p. 1629.

Epilepsy.—DR. C. WICKEL has proposed a modification of the Flechsig opium treatment for this affection. The patient is started on one grain of opium three times a day. On the third and fifth days there is an increase of one-fifth grain with each dose and a similar increase every second day thereafter until the fifty-first day, when the patient is taking fifteen grains of opium in twenty-four hours. On the next day the patient is given ninety grains of mixed bromides. This dose is increased fifteen grains a day until a total of one hundred and thirty-five grains is reached. The patient continues to take this for a couple of weeks.—*Berliner klin. Woch.*, 1900, No. 48.

Coffee and the Nervous System.—DR. W. M. LESZYNSKY maintains that ill effects following the use of coffee are by no means uncommon. Much of the present-day nervousness he attributes to its immoderate use. The symptoms complained of are general headache and nervousness, apprehension regarding the future, mental depression and irritability, insomnia or restless sleep, bad dreams, sudden awakenings, vertigo, general tremulousness, diminished muscular power, loss of appetite, frequent eructation, and constipation. Objective symptoms, in addition, are coated and tremulous tongue, tremor in the eyelids when standing with closed eyes, in some cases dilated pupils, tremor in outstretched hands, rapid pulse of low tension and frequently irregular, ranging from 90 to 130, exaggerated reflexes, and a varying amount of reflex irritability. For the treatment of the condition it is wise to limit the patient to one cup of coffee in the morning or to substitute one of the cereal coffees. A useful mixture, to be used as a sedative, is the following: Sodium bromide, fifteen grains; solution of potassium arseniate, two minims; compound tincture of gentian, one-half ounce; fluid extract of kola, fifteen minims. At the end of five or six weeks the bromide should be discontinued and tonic pills containing arsenic, quinine, and strychnine taken. Recovery should follow in from three to six months. —*Medical Record*, 1901, vol. lix., p. 45.

Yohimbin: A New Aphrodisiac.—DR. L. LÖWY reports on the alkaloid or mixture of alkaloids obtained from the bark of a number of the Rubiaceæ. They exert a marked effect on the vascular supply of the genital organs. Thoms has given the formula $C_{23}H_{32}N_2O_4$ or $C_{22}H_{30}N_2O_4$ to this body, and Oberwarth has determined the lethal dose for guinea-pigs to be one-sixth

of a grain to the kilogramme of animal. In cold-blooded animals, when given in increasing doses, there is a gradual weakening of the functions of the spinal cord, the heart's action is slowed and depressed, and respiration is also depressed. Death is due in frogs to paralysis of the heart's action. Blood-pressure is diminished. In man, according to Löwy's researches, it has a distinct action in the genital sphere. Doses of Yohimbin hydrochloride of from one-tenth to one-sixth of a grain in water, 1 : 500, produce a marked congestion of the ovaries and testicles, with swelling and increase of sexual desire. In a series of cases of Mendel's the impotence of locomotor ataxia was not affected, but the loss of power in prostatic disease and sexual neurasthenia was favorably influenced.—*Therapeutische Monatshefte*, 1900, vol. xiv., p. 597.

Cough in Phthisis.—DR. J. R. L. DALY advises for the treatment of the persistent hard, dry cough of phthisis, with little or no mucus, the following combination : Camphor, two grains ; heroin, one-twelfth of a drachm ; creosote, one drop. These are combined, with a proper vehicle, into pills and given in sufficient quantity to produce the necessary relief. This combination not only relieves the cough, but improves the appetite, and, by means of the stimulating action of the camphor, does away in large part with the depression so frequently observed in this affection. The vomiting is prevented by preventing the severe cough.—*New York Medical Journal*, 1901, vol. lxxiii., p. 16.

Physiology and Therapy of Rontgen Rays : The Treatment of Lupus.—DR. J. HALL EDWARDS quotes Tesla as stating that if an aluminum screen be placed between the tube and the exposed part no irritation of the skin follows. Without the screen, following a few minutes' exposure, a tingling and sensation of warmth was experienced. Later there was deep-seated pain, and the exposed hand was swollen and red ; acute inflammation followed ; the hair was destroyed and nail-growth impaired. These effects probably are due to the presence of the platinum (Tesla). Beyond a short distance no effects were noted, irrespective of the length of exposure. The appearance of the skin is like that following contact with a red-hot iron. The writer, using a less powerful apparatus, finds the harmful effects practically absent. Apart from a special susceptibility of the patient, no ill effects are produced, either in taking radiographs or in using the fluorescent screen, provided that the tube is not brought too near and exposures are short. For therapeutic purposes just the opposite conditions are required for the destruction of tissue. To localize the action of the rays and prevent destruction of healthy tissues round about, an aqueous gelatin solution containing finely powdered iodoform is applied to the healthy skin. Results of treatment of lupus are satisfactory. A more complete knowledge of the length of exposure required and of the after-treatment is still lacking. Following exposure to the rays there is a period of inactivity. That the X-rays themselves have very little or no part to play in the production of burns is shown by the aluminum plate, which prevents burns and is itself wholly transparent to the rays. An electrical origin may be found—*e. g.*, electrostatic action or electrolytic discharge produced in the skin by the near passage of a current of high potential. In sup-

port of this is the fact that an electrical discharge is felt on the skin of a patient in close proximity to a highly charged Crooke's tube. A distinct crackling is heard and felt. It is noticeable in dry skins but absent in those that are moist.—*Edinburgh Medical Journal*, 1900, vol. vii., p. 139.

Strychnine as an Ecbolic.—DOTT. ROBECCHI has experimented with various doses and is certain that in no instance does it have a direct influence upon uterine contraction, but that the good effects ascribed to it, by various authors, from prolonged administration during pregnancy are due to the general action of the drug and not to any selective action upon the uterus. —*Gazetta degli Ospedali e delle Cliniche*, 1900, No. 96, p. 1008.

Melan: A New Stimulant for Wounds.—DR. M. HOROVITZ reports a new product prepared by condensation of the flowers, leaves, and stones of *melilotus cœruleus*, one of the native legumes of South Europe and America. It is widely cultivated in Switzerland and Southern Germany, where it is used as a dressing for wounds. It is an oily substance, dark brown in color, and markedly aromatic. It is said to have a marked stimulating action on ulcers, and, when combined with a mild antiseptic, its effects on the regeneration of new skin are prompt. The author reports excellent results when used with yellow wax in the proportion of 2 to 3, and with zinc oxide and magnesia in persistent ulcers, ulcus durum, ulcus molle, and ulcus cruris, rhagades, anal fissures, herpes preputialis and balanitis, and in various forms of chronic eczema.—*Centralblatt für die gesammte Therapie*, 1900, vol. xviii., p. 641.

Syphilis and Calomel Injections.—DR. ALFRED FOURNIER, in discussing the value of hypodermatic injections of calomel in the treatment of syphilis, concludes that the routine treatment of syphilis by this means is not to be encouraged. It presents too many disagreeable features if it is necessary to continue its use for a more or less protracted time ; but in sudden, severe inroads of the syphilitic virus, such as occur in spinal or cerebral complications, iritis phagedenia, palmar and plantar laryngitis, and at times in some of the syphilitic pneumopathies, it may be recommended strongly. It is, all things considered, a temporary, provisional mode of treating the disease, which serves a useful purpose, with certain limitations.—*Revue de Therapeutique*, 1900, vol. lxvii., p. 721.

Iodism.—DR. DOUGLASS W. MONTGOMERY makes a useful contribution to the untoward action of the iodides. He holds that small doses do not induce iodism more rapidly than larger ones, but the contrary teaching has had credence because of the fact that small doses have frequently given rise to iodism, which, on the continuance of the drug in larger amounts, has disappeared. This is explained by reason of the fact that many people soon become accustomed to the drug, and that tolerance is established shortly after the early irritation induced by the smaller dosage. If administration of the iodides is commenced in small doses, seven to eight grains, iodism rarely occurs. Potassium iodide may be tolerated by the rectum when it would not be by the stomach, and can be given as an enema in water, or, better, in milk, fifteen

to thirty grains, three times a day. Personal idiosyncrasy is the most important element, and nothing will absolutely prevent iodism if the tendency exists. The most important agents capable of modifying some of the symptoms of iodism are belladonna, arsenic, morphine, salol, sulphanilic acid, sodium bicarbonate, and sodium chlorate. Belladonna in five-minim doses of the tincture is sufficient in relieving the coryza. Fowler's solution is the best associate drug if an iodide causes indigestion. One drop to fifteen grains of the iodide is the proportion recommended. Potassium bromide, sulphanilic acid, and sodium bicarbonate have all been recommended, but the author has not obtained valuable results. Sodium chlorate and salol, when given, have permitted of larger doses without the causation of iodism. —*Medical Age*, 1900, vol. xviii., p. 765.

Treatment of Typhoid.—DR. F. C. KEAYS gives the treatment of typhoid followed at the New York Hospital. The tub bath is used as a routine procedure when the temperature reaches 103° F. It is given every three hours, for ten to fifteen minutes, first at a temperature of 80° F. and gradually reduced to 70° to 65° F. Cooled alcohol sponge baths are used when tubbing cannot be adopted. The insomnia is treated by trional and codeine, fifteen and one grains respectively, given by the mouth, or, if there is nausea, by the rectum. Whiskey is also of value, especially in those patients who have habitually used alcoholic drinks. Distention of the intestines by gases is treated by turpentine stupes or by five to fifteen minims of turpentine by the mouth or rectum. Oxalate of cerium, five grains, and sodium bicarbonate, ten grains, are useful for the nausea. The diet should be wholly liquid in the early stages.— *Medical Record*, 1900, vol. lviii., p. 851.

Poisoning by Coal-tar Naphtha.—DR. G. HERBERT DOUTHWAITE reports a case of poisoning by ingestion of this substance occurring in a girl, aged five years, who had evidently taken from two to three ounces. She was seen within two hours and was found then comatose, breathing rapidly and heavily. There was a strong benzol odor to the breath, the face was dusky, somewhat livid, and the extremities were clammy and cold. The pupils were dilated and the conjunctivæ anæsthetic. Artificial respiration, brandy, and respiratory stimulants were successfully used and the child recovered from the poisoning, but two days later developed an acute general bronchitis, from which she died seven days later.—*Lancet*, 1901, vol. clx., p. 245.

Treatment of Gastric Ulcer.—DR. MAYO ROBSON says, with reference to this question, that the treatment of this condition is at first essentially medical, and if properly carried out and for a sufficient length of time it is usually completely successful ; but in many cases, either from the uncertainty of diagnosis or from the impatience of the patient, care in diet and rest are not persevered in for a sufficient length of time and relapses result; treatment is again resorted to, and relief, but not cure, follows, until in the long run complications supervene or the ulcer becomes chronic, when surgical treatment is in many cases the only method capable of affording relief.—*British Medical Journal*, 1901, No. 2092, p. 257.

OBSTETRICS.

UNDER THE CHARGE OF

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The Treatment of Persistent Occipito-posterior Positions of the Vertex. —Under this title BRODHEAD, in a paper read before the New York Obstetrical Society (*American Journal of Obstetrics,* December, 1900) advises the use of forceps as rotators in persistent posterior rotation of the vertex during labor.

The conditions which should be present before this operation is undertaken are as follows: The head should be as well flexed as possible ; the vertex should be well down in the pelvis and preferably at the vulvar outlet ; the membranes must be ruptured ; the cervix should be fully dilated or dilatable ; the bladder and rectum should be empty ; last, but not least, the operator should be positive of his diagnosis of position. The patient is placed upon a table and a light chloroform anæsthesia used. The Tucker solid-bladed forceps has been superior to any other. The blades are introduced laterally at the sides of the pelvis, each blade being rotated so as to occupy a position at the side of the head, after which the forceps is locked. Unless the operator be expert it is thought safer to apply the forceps in the usual manner, the concavity of the pelvic curve looking forward, than to attempt rotation with the forceps in the inverted position. By carrying the handles of the instrument toward the thigh of the patient, toward which the concavity of the pelvic curve looks, the danger of laceration is much reduced. The operator then places two fingers upon the vertex at the sagittal suture, and when the uterus contracts it rotates the head partially, so that the sagittal suture is transverse. This is accomplished by rotating the handles of the forceps and carrying the handles downward and backward until the concavity of the pelvic curve faces the lateral wall of the pelvis. The head is then held in this transverse position until several uterine contractions and relaxations have occurred. The head is then rotated with the vertex anterior by rotating the handles, carrying them still further backward and downward. In this way the tips of the blades are kept in the middle of the pelvis, and cannot lacerate the vagina. The head is held in the oblique anterior position for several moments to allow the body to rotate anteriorly. The forceps is usually removed at this time and reapplied in the usual manner and the operation completed.

If rotation cannot be accomplished except by the use of force the head must be extracted in the posterior position. If delivery can be accomplished by the natural forces the forceps is removed. The writer reports eight cases, in four of which the vertex was upon the left side and posterior and in four

on the right side and posterior. Seven of these women had normal pelves. One, a primigravida, had a justo-minor pelvis. The operation was uniformly successful in these cases. The writer urges that the conditions essential are good flexion of the head, low position of the vertex, and attention to details.

In discussing this paper, CRAGIN said that the same methods, as a rule, were employed successfully at the Sloane Maternity. He urged the necessity for very careful and thorough diagnosis before the application of forceps. The value of the solid-bladed instrument he considered as proved. He had found it of value to introduce one of the blades in the median line and posteriorly, using it as a vectis in starting the rotation of the child's head, then introducing the other blade laterally. He believed that rotation of the forceps was the best treatment for the majority of such cases.

EDGAR had used forceps as rotators for many years to advantage. He preferred the solid blades in these cases. He also believed that the forceps could be adapted to the child's head. In diagnosis he found it useful to search for the ear as a landmark, and had found diagnosis not always easy in these cases. He had not found manual correction of occipito-posterior positions very successful, and he had not succeeded with combined external and internal manipulation. In many cases if the head were brought down upon the levator ani muscle and the patient let alone the case would terminate spontaneously. He believed that the forceps should be applied over the ears of the child and the head brought down to the pelvic floor; then if there were no immediate indication for delivery spontaneous birth might develop. He thought it well to bring the head down in the parturient canal in a transverse position, then to take off the forceps and reapply them, and so bring the head around to the anterior position. In occasional cases in skilful hands the reverse use of the forceps is permissible.

McLEAN depended upon the hand in making restitution in these cases. He believed mistakes in diagnosis frequent, and that diagnosis by sutures and fontanelles is not always reliable. When the head of the child was hindered in rotation by the body he had been successful by rotating the child in the opposite direction, bringing the vertex through the larger arc of the pelvic circle. It was difficult to account for this phenomenon unless the cord, passed about the shoulders of the child, hindered its normal rotation.

TUCKER thoroughly indorsed the rotation of the occiput by forceps. He mentioned a case in which ventral fixation had been done when the occiput turned behind and rotation was hindered by a deformed coccyx. The head was turned to the front by forceps. In this patient's next labor posterior rotation again occurred, and delivery was effected in the same manner successfully. He believed that if the operation were done promptly before the parts became œdematous the pelvic floor and vagina would not be injured by the operation. He preferred the solid-bladed instrument.

VON RAMDOHR believed that after the shoulders had engaged in the pelvis with the head on the perineum, it was impossible to twist the head through an arc from 90° to 150° without great danger. When the shoulders are not fully engaged and the head is not absolutely on the perineum, this is possible. He believed that when the head is above the superior strait, with the occiput posterior, we can never be assured that anterior rotation is not the result of the natural forces instead of manipulation employed.

The Secretion of Milk.—In *L'Obstetrique*, November, 1900, BUDIN publishes a paper in which he gives several practical points obtained by clinical observation of the secretion of milk.

He calls attention to a not uncommon class of cases in which the secretion of milk becomes established, but is for some time not sufficient to meet the needs of the child fully. Experience has shown that if the child be nourished by suitably prepared cow's milk and the mother be allowed to nurse the child in addition both do well. The child ceases to lose in weight, but gains, and the mother in a few weeks has an increased secretion of milk, which usually enables her to dispense with artificial feeding. He is opposed to abandoning the nursing of the child because the secretion of milk may not be abundant. He would supplement the mother's supply, giving the mother proper nourishment, and would hope and expect that later she would be completely able to feed the child. He also calls attention to the fact that the supply of breast milk varies in accordance with the child's needs. This is demonstrated by comparing the weight of the child with the quantity of milk furnished and also by observing the secretion of milk in the case of twin pregnancies. Here the supply increases to meet the needs of the two children in proportion with their growth.

He narrates some interesting cases in which the secretion of milk has been resumed after a considerable pause. In one instance a woman had been separated from her child in the country, and hearing that the child was ill, returned thirty-four days after its birth. In this case the breasts were well formed, soft, and large, although when the child began to nurse fluid was not present in them.

Abdominal Tumor (Included Fœtus).—In the *British Medical Journal*, 1900, No. 2081, WRIGHT and WYLIE report the case of a female child, aged three months, whose mother gave the following history : The child's abdomen had been swollen since birth, the labor being long and difficult. The abdomen had gradually increased in size and the patient had difficulty in breathing, with chronic cough.

An enormous mass could be felt on the left side of the child's abdomen, reaching forward to beyond the umbilicus. The tumor was dull, its front and upper portion cystic and its posterior part solid ; it was smooth and uniform. As the tumor seemed to have fluid contents it was tapped, and nineteen ounces of clear, yellow fluid were removed. This was slightly albuminous. The tumor then became considerably smaller, and its edges could be distinctly felt. It grew larger, however, until it regained its original size.

On operation the tumor was found to have wide attachments, there being a large number of vessels in the capsule. It was removed, and efforts were made to combat the shock, which became severe. These efforts were unsuccessful, the child dying in a few hours after the operation.

On examination the tumor was found to be an included twin or included fœtus. It was intra-abdominal, and of the type known as amorphous or anideus. Some thirty cases of included fœtus in the cavity of the abdomen have been recorded. The tumor is usually found on the left side, is rudimentary in character, and has very few recognizable viscera and structures within its mass. The cystic may be a development of the umbilical vesicle.

Hepatic Toxæmia during Pregnancy.—In the *Medical Chronicle*, 1900, p. 183, FOTHERGILL reports the case of a patient, aged thirty-two years, and pregnant for the first time. She developed great œdema of the lower extremities, scanty urine and abundant albumin, and much bile pigment and urates. The liver was tender on pressure and increased in size. Purgative treatment reduced the liver dulness, and fluid began to collect in the abdomen. The urine was full of bile pigment. As the patient continued to grow worse, the uterus was emptied, and a badly nourished seven months' child was born, living, and survived four days. The patient gradually rallied, and bile began to flow into the intestine. The liver decreased in size, the quantity of urea passed steadily increased, and the patient gradually made a recovery.

In this auto-intoxication of pregnancy it was interesting to observe that the uterus reacted very sluggishly to stimulation. An elastic dilator remained in the cervix for seven hours without setting up uterine contraction. While this patient did not seem to be threatened with convulsions, there can be no question that her condition would have proved fatal from the absorption of the toxins which the liver failed to remove.

Transverse Presentation and Version.—BERRY HART (*Scottish Medical and Surgical Journal*, July, 1900) contributes a paper upon this subject, in which he considers that there are three great varieties of version : The first, cephalic, not often used, and practically performed by external manipulation only. By Simpson's combined version, Hart understands those cases where the internal hand is passed into the uterine cavity to seize a foot, the external hand being also used in the version. This is the usual method for cases in which the fœtus is fixed in the pelvis. Braxton Hicks' method, where the internal fingers do not pass beyond the presenting part, while the external hand aids in the manipulations, usually has the term Hicks' bipolar version applied to it. As regards the foot and leg which should be seized in performing version, Hicks urges to seize the leg which maintains the dorso-anterior position or converts the dorso-posterior into a dorso-anterior. When the back of the child is behind he would grasp the further leg. When the back is in front he would take the leg which lies nearer. When the breech is near the os in dorso-posterior position, traction on the further leg may not alter the posterior position of the back after version, owing to the want of the necessary obliquity in the pull.

[In performing version and extraction the operator must always endeavor to bring the back of the child anterior. If both thighs be grasped, a rotary motion upon the thighs will usually succeed in correcting any tendency on the part of the back to turn behind. If the uterus resists this manipulation, chloroform may be used to overcome its contraction.—ED.]

Puerperal Inguinal Parametritis.—A very interesting clinical lecture on this important subject by HERMAN is reported in the *British Medical Journal*, 1900, p. 1273. The writer confines himself to the common form of puerperal cellulitis exclusively. He believes that during pregnancy the cellular tissue about the uterus becomes loosened, that it is more vascular than usual, and, hence, that it is naturally a fertile soil for the development of inflammation. In the most common form the inflammation spreads into the in-

guinal region, producing a swelling in the groin. This may end in absorption or in suppuration. When the latter takes place it points above the middle of Poupart's ligament.

We are not able to state definitely the precise cause of this affection. The streptococcus, the staphylococcus, and the bacillus coli communis have been found in the pus. The effects of the same germs vary in different cases. In one a slight local inflammation may result, with very serious septic depressions, while in other cases a more extensive inflammation seems to be well resisted. Attempts to produce cellulitis in animals by the injection of cultures of germs have not been successful. There can be, however, no question that parturition favors the occurrence of this condition, whether by mechanically setting free the germs in these tissues cannot be definitely stated.

Some have thought that laceration of the cervix is a cause. Deep laceration, however, is often found in patients who have never had cellular inflammation, while in other cases no laceration of the cervix is present. Gonorrhœa is not a frequent cause, nor does chilling the body seem to produce it. The labor does not seem to have been especially difficult with these patients. In fact, in two-thirds of the cases there was no difficulty in the labor. The disease occurs more frequently on the left side than on the right.

When we consider the period of the puerperal state at which this complication shows itself we find that many cases are ill from the very day of delivery, while others are affected only after the first week. The later the illness comes on the greater seems to be the danger of suppuration. Pain is a paramount symptom referred to the affected side, and described as burning or shooting. Rigor occurs in about one-quarter of the cases, and varies in severity. These patients were naturally depressed, having a temperature of from 99° to 106° F.

The physical signs were found in swelling, which, starting from the anterior superior spine, approaches the level of the umbilicus. It then runs horizontally inward.

As regards treatment, it must be early, thorough, and persistent. Its essential element consists in absolute rest. This many patients cannot obtain in their own homes, and, hence, should soon be transferred to hospitals. So soon as evidence of suppuration is present the tissue should be incised and the pus allowed to escape. This is usually marked by very decided and permanent improvement.

As regards the length of the illness, the shortest case observed lasted twenty-three days and the longest one hundred and forty-nine days. Among those cases in which pus formed the average length of the illness was ninety-three days. When the inflammation spreads toward the psoas muscle the patient flexes the thigh and complains of considerable pain in this region. These cases are severe. In some cases albuminuria was present without casts and pus. In treatment the most essential thing at first is to keep the patient at absolute rest and maintain her strength by food, using narcotics if necessary. The functions of the body should all be stimulated and a close watch kept of the temperature and of the physical signs indicating suppuration. So soon as pus forms it should be allowed to escape freely.

Eclampsia at Six Months' Pregnancy Treated by Saline Infusion and Veratrum Viride.—BALLANTYNE (*Scottish Medical and Surgical Journal,* July, 1900) reports the case of a multipara, six months pregnant, who had typical eclampsia. The patient was treated by veratrum viride hypodermatically and by the injection of saline fluid into the loose tissue below the breasts. Abortion was also induced, though very slowly, as the os and cervix were so small that an elastic bag could not be introduced. The patient gradually made a good recovery. An interesting point in the case was the behavior of the various specimens of urine obtained. The urine was highly albuminous, and did not decompose as it usually does. It was observed that the urine passed during the eclampsia or just before it did not undergo decomposition, as it normally does.

[Nothing is said regarding the percentage of solids contained in the urine, nor the quantity of urea. The case seems to have been a favorable one for treatment, because albuminuria is, in our experience, less dangerous than a profound and slowly developing toxæmia.—ED.]

When Should Interference Be Practised in Difficult or Delayed Labor, Especially in Primiparæ?—McLEAN contributes to the *Medical News,* 1900, p. 1033, a paper under the above title. He lays special stress on the preparation of the maternal tissues for delivery. By the natural processes the tissues are so softened that traumatism is reduced to the lowest possible point. It is most important to distinguish between a condition of absolute failure in the progress of labor and one which only marks the usual slow development of the natural process of softening and dilatation. If interference be practised before the tissues are ready, traumatism is almost inevitable. If, on the other hand, operative interference be employed when the tissues are ready for delivery, no serious injury should follow.

GYNECOLOGY.

UNDER THE CHARGE OF

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Post-operative Ileus.—WINTERNITZ (*Centralblatt für Gynäkologie,* 1900, No. 40) distinguishes three varieties of post-operative ileus, viz., that due to septic peritonitis, to adhesions of the intestines of non-septic origin, and a third form caused by pressure from clamps, gauze, etc. The latter can be avoided in vaginal operations by extreme elevation of the pelvis.

His conclusions with regard to the treatment of this complication are as follows:

1. In cases of non-septic intestinal obstruction following vaginal operations an attempt should first be made to separate the adhesions per vaginam;

this failing, the abdomen should be opened.   2. When ileus follows an aseptic cœliotomy the wound should be reopened and the distended gut incised in several places.   3. The same treatment is applicable to cases of paralysis of the intestine.   4. Operative treatment is useless in post-operative septic peritonitis.

Vaginal Cœliotomy.—FRITSCH (*Centralblatt für Gynäkologie*, 1900, No. 40) lays down certain rules for the guidance of the surgeon, viz.: Vaginal ovariotomy is justifiable only in the case of cysts which are clearly benign in character.   Myomectomy by the vaginal route should be limited to cases in which the tumor is freely movable and does not exceed in size a child's head.   An old retrouterine hæmatocele should be attacked per vaginam only, nor should an attempt be made to extirpate the sac.   In cases of recent ectopic gestation, on the other hand, larger than the first, which are not easily accessible from below, the abdominal route is to be preferred. Pus-sacs are best emptied per vaginam, but if the operator aims to remove the diseased adnexa and spare the uterus he should elect cœliotomy.

Complications of Uterine Fibroids.—FREUND (*Centralblatt für Gynäkologie*, 1900, No. 40) calls attention to the significance of a varicose condition of the veins of the pelvis and lower extremities in connection with fibroid tumors of the uterus.   Not only is there considerable danger of hemorrhage during and after operation from distention of the pelvic veins, but pulmonary embolism is a possible result.

The writer reports two fatal cases in which the patients complained soon after operation of severe pelvic pains, with pressure upon the bladder and rectum, followed by a sudden relief of the symptoms, but with restlessness, rapid pulse, and collapse, the temperature remaining normal.   In both instances a large hæmatoma was found in the broad ligament, which had exerted so much traction upon the stumps that the ligatures had slipped. The hemorrhage was due to the puncture of large veins below the points at which the ligatures were tied.   The same writer describes degenerative changes in fibroids due to sclerosis of the peripheral arteries and venous thrombosis, without purulent foci or evidences of septic micro-organisms. The symptoms due to this condition are those of auto-intoxication, but are quite different from the sapræmic or septic poisoning referable to suppuration in the growth.   In the case reported the diagnosis before operation was strengthened by the presence of acetone in the urine.

Lowering of Blood-pressure after Gynecological Operations.—SCHRÖDER (*Centralblatt für Gynäkologie*, 1900, No. 40), as the result of numerous observations, finds that there is a marked difference in the blood-pressure after the removal of diseased adnexa and of neoplasms of the ovaries and uterus, it being lower in the former case.   There was a sudden drop in the pressure during the operation, the curve rising gradually for a few days and then declining to its former level.   During long operations the fall was often as great as forty or fifty millimetres, but within an hour or two the pressure increased, reaching its highest point on the first night or following days. Between the eighth and fourteenth the curve was lower than at any time,

rising slowly, with slight remissions, to fall again for a short time when the patient first sat up.

In severe operations and when the heart was strongly affected by chloroform the blood-pressure increased very slowly and seldom exceeded the average point immediately after operation. In fatal cases the rise was followed by a sudden and permanent fall.

In pus cases the primary rise was greater than in simple ovariotomies, and after a slight fall continued. After vaginal operations diminution of blood-pressure was less marked and the succeeding increase less than after cœliotomy.

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Ovarian Cyst Developing from Remains of Ovary.—WALDSTEIN (*Centralblatt für Gynäkologie*, 1900, No. 40) reports four cases from Schauta's clinic in which small portions of cystic ovaries were left behind during complicated operations, the uterus being removed in two instances. In each case a cystoma developed, necessitating a second operation for its removal. The writer concludes that the practice of leaving portions of the ovary after extirpation of the uterus is one of questionable value, the advantages being offset by the possibility of the development of future complications.

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Etiology of Climacteric Hemorrhages.—THEILHABER (*Münchener med. Wochenschrift*, 1900, No. 14) believes that in the majority of the cases hemorrhages before the menopause are due to muscular atony. The atrophy of the uterine muscle which is present after the climacteric takes place gradually and is associated with stenosis of the arteries, so that even when the uterine contractions are feeble there is but slight loss of blood. If, however, this atrophy takes place before the stenosis occurs, the muscular contractions are too feeble to control the hyperæmia, hence there result profuse menorrhagia, œdema, and hypertrophy of the uterine tissues.

This same atony is the cause of menorrhagia in young girls, in chlorotic and tubercular patients. The prolongation of menorrhagia in patients with uterine fibroids is doubtless due to atrophy of the uterine muscle, with resulting prolonged hyperæmia of the mucosa and the development of endometritis fungosa. In consequence of this hyperæmia the tumor may grow rapidly at this time, while submucous interstitial growths tend to become polypoid.

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Pathogenesis of Fissure of the Anus.—ROSENBACH (*Berlin. klin. Wochenschrift*, 1900, No. 10) believes that the pain in fissure of the anus is due primarily to the ulcer and secondarily to spasm of the sphincter muscle. The latter is most marked in patients with circulatory disturbances of the pelvis, as at the climacteric or during pregnancy, in whom, in addition to habitual constipation, there is a general hyperæsthetic condition.

In his opinion it is not sufficient to dilate the sphincter forcibly. In addition to regulating the bowels he secures tolerance of the sphincter by instructing the patient to pass the finger into the anus several times daily and later to use rectal tubes of increasing sizes. Under this treatment within four or five days the pain and tenesmus become less marked and eventually disappear.

Prolapsus Uteri in a Young Girl.—VILLEMIN (*Gaz. hebdom. de Méd. et de Chir.*, 1900, No. 15) reports the case of a girl, aged fourteen years, with hypertrophy of the cervix and prolapsus, the cervix protruding an inch from the vagina. The patient stated that two years before, while lifting a heavy weight, she was seized with a severe pain in the abdomen and fainted. On her recovery she felt the protrusion, but concealed the fact on account of modesty.

The cervix was amputated and hysteropexy successfully performed.

[That these cases are not rare is shown by our recent experience in two similar cases, the patients being virgins, aged eighteen and nineteen years respectively. Both gave the history of a severe muscular effort. The cervix was amputated in both instances, followed by ventrosuspension in one and shortening of the round ligaments in the other, with equally satisfactory results.—ED.]

The Ovaries in Osteomalacia.—SCHARFE (*Centralblatt für Gynäkologie*, 1900, No. 45) denies that certain pathological changes in the ovary are constant in cases of osteomalacia. From microscopical studies of ovaries removed from three osteomalacic patients he infers that neither hyalin degeneration nor hypertrophy of the vessel-walls is characteristic of this condition, as has been affirmed.

Supravaginal Amputation for Uterine Fibroids—GOW (*Scalpel*, 1900, No. 2) reports forty-seven operations, with one death. He always operates by the abdominal method, preserving the ovaries unless they are actually diseased. The stump is carefully sutured in tiers before the peritoneal flaps are united over it. In addition to tying the uterine and ovarian arteries separately the stump is transfixed with a double ligature, which is tied on either side.

Fatal Cases of Gonorrhœal Salpingitis.—KOSSMANN (*Münchener med. Wochenschrift*, 1900, Nos. 10 and 12) reports two cases of subacute pelvic peritonitis in which conservative operations were performed on the ovaries by the vaginal route, the tubes at the time of operation presenting no evidence of pus. In both cases the patients succumbed to diffuse peritonitis, the pus from the abdominal cavity containing pure cultures of gonococci, but no other micro-organisms.

Operation for Adherent Uterus.—STEFFECK (*Centralblatt für Gynäkologie*, 1900, No. 46) reports twenty-five cases treated successfully by the following method: Douglas' pouch is opened and the posterior vaginal wall is divided longitudinally as low down as the attachment of the rectum. Two fingers are introduced, and the adhesions are separated under the uterus, is perfectly movable, and the fingers can be passed over the fundus. The wound is then closed and the anterior vaginal fornix is opened. While the uterus is drawn downward with a volsellum, anterior adhesions are separated and the fundus is sutured to the upper angle of a longitudinal incision in the anterior vaginal wall, which is carried downward from the transverse one. The wounds are then closed with catgut.

The writer emphasizes the fact that the adnexa must be removed when they are diseased. He reserves abdominal section for the most severe cases.

[It is difficult to understand how one can give such unqualified preference to vaginal over abdominal section for the separation of intrapelvic adhesions. Aside from the fact that the operator can never be sure that he has separated all such adhesions when guided by the touch alone, the opportunities for intelligent conservative work on the adnexa are so much better by the abdominal route that it must commend itself to most American surgeons. —ED.]

Hemorrhages at the Climacteric.—LANDAU (*Therapie der Gegenwart; Centralblatt für Gynäkologie*, 1900, No. 46) insists upon the importance of regarding all hemorrhages at this time with suspicion, and believes that women should be examined from time to time in order to be sure that their genital organs are in a normal condition.

While local atheroma of the arteries, senile endometritis, etc., may account for this symptom in some cases, one should always regard cancer as the most probable condition. In this connection he refers to a series of 190 cases investigated by an English gynecologist in which neoplasms were found in 100 patients, half of these being malignant.

Irritable Bladder.—KNORR (*Ibid.*) describes this condition as marked by frequent micturition and tenesmus, which is frequently regarded as a pure neurosis, though he has rarely found these symptoms present without marked anatomical changes.

In sixty-three cases in which the symptom-complex of irritable bladder was present the organ was not entirely normal in a single instance. In forty-seven pericystitis, adhesions, pressure, etc., were demonstrated to be the cause of the irritability. The treatment recommended is irrigation and distention of the bladder with a solution of boric acid.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Metastatic Gonorrhœal Conjunctivitis.—DR. FAGE (Amiens) reports the sudden appearance of all the symptoms of severe purulent conjunctivitis, except the discharge, in a man of forty-five, who was suffering at the time from an active gonorrhœa. Bacteriological examination entirely failed to show the presence of the gonococcus in the conjunctiva. Under soothing appli-

cations the conjunctivitis began to improve in two days, and in eight days, except for some small ecchymoses, the eyes were quite well.—*Recueil d'Ophthalmologie*, April, 1900.

[Some cases of this kind have been recorded before, and probably they are less rare than the records would indicate. Morax and Elmassian have demonstrated that the toxines of the gonococcus are entirely able to produce the symptoms of gonorrhœal ophthalmia, after the destruction of the gonococci in the culture fluid, or their removal by filtration. But the assumption that the toxines could reach the conjunctiva in sufficient concentration through the general circulation seems rather a bold one, although no more reasonable explanation for such an attack can now be suggested.—Ed.]

Retinal Thrombosis and Phlebitis of Gonorrhœal Origin.—Dr. Galezowski (Paris) ascribes to the influence of a general gonorrhœal infection alterations and thrombosis of the retinal veins, in a man who had suffered for ten years with a urethral discharge, with repeated attacks of rheumatism and violent sciatica, but who was free from syphilis and other probable causes for the vascular disease.—*Société d'Ophthalmologie de Paris*, April 3, 1900.

Tincture of Iodine for Corneal Ulcers.—H. Friedenwald (Baltimore) has employed this treatment in twenty-five cases of dendritic keratitis and marginal ulcer of the cornea without failure to bring relief and without untoward symptoms. He makes the application in the following manner:

A bit of absorbent cotton is wrapped firmly about a fine wood toothpick, so as to form a narrow, firm swab. This is dipped into the tincture of iodine, and the excess allowed to drop off. The eye having been prepared, by instilling cocaine and a drop of fluorescine, the ulcerated area is thoroughly scrubbed until a distinct brown discoloration of the tissues is seen. The neighboring epithelium is very much loosened and curls up in all directions. It is important to touch this and especially the minute infiltrations seen a millimetre or two away from the main line of ulceration; for the progress of the disease is usually this: that after these infiltrations are observed the furrowed ulceration soon makes its appearance. The only error which is likely to be made is to apply the iodine too cautiously. He has never seen any ill effect from its being used too freely. Since he has become bolder in using it, it is rare that a second application is needed.

The application is usually followed by some pain, lasting for a few hours. The eye is bandaged and an ointment of boric acid, iodol, or the like is applied. The bandage can usually be dispensed with after a day or two, though it may be well to use the ointment a few days longer.—*American Journal of Ophthalmology*, July, 1900

Insomnia from Errors of Refraction.—A. Trousseau (Paris) finds that patients troubled with insomnia generally suffer from headache, although they may not emphasize this symptom. The headache is in the great proportion of cases due to fatigue of the eyes, although it may come on during the night. The fatigue may be due, in hyperopic or astigmatic eyes, to pro-

longed near work during the evenings. In myopes it arises from use of the eyes in distant vision. In some cases the insomnia is the only symptom noted, but the relief from eye-strain is sufficient to secure normal sleep.— *Archives d' Ophthalmologie*, June, 1900.

Iritis in the Prognosis of Syphilis.—A. TROUSSEAU (Paris) reports a series of observations in support of a view of Fournier, that iritis in syphilis is of grave prognostic significance. Of 61 cases 21 had passed from under observation; of the other 40, 6 had experienced but slight trouble; 12 became tabetic; 8 had various cerebral manifestations of syphilis; 2 had died, probably of cerebral or visceral lesions, and the others had suffered from serious tertiary symptoms, chiefly of the nervous system.—*Annales d' Oculistique*, May, 1900.

[Only about 3 per cent. of all cases of syphilis suffer from iritis; but in these cases it is evidently of especial importance, as Trousseau urges, to keep the patient under observation and prolonged systematic treatment.]

Visual Disturbances in Acromegaly.—W. A. HOLDEN (New York) states that nearly two hundred cases of acromegaly have been reported, and that visual disturbances have been noted in about one-half of them. In over 50 per cent. of these there has been concentric contraction of the visual field, with diminution of central acuteness of vision. In somewhat less than 50 per cent. there has been bitemporal hemianopsia, absolute or for colors only, with or without some contraction of the nasal halves of the fields. In half a dozen cases there has been homonymous hemianopsia, absolute or for colors only, and in one case there was found binasal hemianopsia.

There is no special time for the appearance of visual symptoms. These come on, occasionally, soon after the enlargement of the extremities is noticed, but usually not until years after, and the disease may exist for ten or fifteen years without the appearance of any visual disturbance whatever.—*Archives of Neurology and Psychopathology*, v. iii.

DERMATOLOGY.

UNDER THE CHARGE OF

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Monilethrix.—E. WOOD RUGGLES (*Journal of Cutaneous and Genitourinary Diseases*, November, 1900) reports a case of this rare affection of the hair, characterized by a nodose or beaded condition, resulting in baldness of the invaded area, whether on the scalp or other portion of the body. In this affection there exist alternate enlargements and contractions of the

hair-shaft, the enlargements or nodes being long and spindle-shaped, causing marked variations in the diameter of the hairs. The most plausible theory as to its etiology is that it is a trophoneurosis, no bacteria being found. McCall Anderson found fourteen cases in five generations, and Sabouraud seventeen cases in five generations. In the present case the legs (both surfaces) were the seat of the disease, the patient being a man, aged thirty-six years.

Carcinoma Hemorrhagica Developed on a Nævus Vasculosus.—DUB-REUILH and ROCHER (*Journal de Méd. de Bordeaux*, June 10, 1900) record the case of a woman, aged fifty-four years, who four years before began to show progressive degenerative changes in a nævus that had previously remained quiescent. A hemorrhagic tumor gradually occupied the former simple nævus, which on extirpation was found to be composed of polymorphous cells, with large, oval nuclei and a finely granular protoplasm.

Variations in the Elimination of Urea in Dermatitis Herpetiformis.—HARDOUIN (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 11), as the result of his observations, concludes that there is a constant relationship between the variations in the excretion of urea and the eruptive outbreaks undergone by the patient with dermatitis herpetiformis (painful polymorphous dermatitis). The attacks always take place after a period of hypoazoturia, and always coincide with a considerable increase in the elimination of urea, although this increase may have already begun before the outbreak or may be the immediate sequence of it. The author offers no explanation of this relationship, believing that new observations are necessary before forming any definite conclusions.

Epicarin.—PFEIFFENBERGER (*Dermatologische Zeitschrift*, December, 1900), who has employed epicarin in more than fifty children, from one to fourteen years of age, has found it a most valuable remedy in scabies and prurigo. In the former the effect was always prompt, a cure being obtained without any irritation, even in the severest cases, after five or six inunctions. The annoying itching disappeared in most cases after the first rubbing, and the average duration of treatment was less than nine days. In prurigo the action of the remedy was quicker and more certain even than in scabies, the itching disappearing with the first inunction and the papules vanishing with the desquamation which followed. The following formula was used: Epicarin, 7; cret. alb., 2; vaselin, 30; lanolin, 15; axung. porc., 45.

A New Case of Protozoic Dermatitis.—D. W. MONTGOMERY (*British Journal of Dermatology*, October, 1900) reports the following interesting case: A man, aged twenty-one years, entered the German Hospital of San Francisco apparently suffering from pulmonary consumption. His disease began with cough seven or eight months previous to his entrance into the hospital. The skin lesions, the first of which appeared over the right eye, began as dark red, circumscribed nodules, with purulent tops. The tops ulcerating, ulcers with overhanging, ragged edges formed with dirty, uneven floor, covered by a scab. The nodules, which became quite large, projected

well out from the skin and were constricted at the base, resembling the lesions of mycosis fungoides and those occasionally seen in iodide of potassium poisoning. They caused no particular discomfort nor were they tender upon pressure. The lesions were situated upon the scalp, face, arms, neck, buttocks, and thighs, and numbered between twenty-five and thirty. Microscopical examination of an excised tumor showed coccidioid micro-organisms in great numbers. The patient dying two months later, autopsy disclosed numerous large abscesses in the neck, subcutaneous tissues over the chest, in the pleural cavity, and the lung, all communicating with one another. In the pus of these abscesses coccidia-like bodies were easily demonstrable. The lesions were composed of granulation tissue with giant cells and numerous small abscesses. The micro-organisms were found in the giant cells and scattered free in the granulation tissue, but very rarely in the abscesses. Inoculation of a rabbit was without result.

Sapolan.—MRACEK (*Archiv für Dermatologie und Syphilis*, Band liii., Heft 2 and 3), at a recent session of the Vienna Dermatological Society, introduced a new remedial agent for the treatment of diseases of the skin under the name of sapolan. It is composed of 2.5 parts of a specially extracted and fractionally distilled naphtha product, 1.5 parts lanolin and 3 to 4 per cent. soap, for the purpose of giving it consistency. Employed in five cases of acute eczema, recovery took place in from three to six days; in two cases of chronic eczema rapid improvement occurred after its use. In two cases of senile pruritus the itching was immediately relieved and a cure took place in two to three weeks. It was also successfully employed in impetigo contagiosa, scabies, ecthyma, and urticaria.

The Tuberculides.—T. COLCOTT FOX (*British Journal of Dermatology*, November, 1900) makes a full investigation of this subject, based on the existing literature and his own experience, and concludes that although the pathogeny of these eruptions is not yet placed on a firm basis, yet there exists evidence, both positive and exclusive, pointing to their tuberculous origin; they are not the result of a cachexia or a secondary change arising on a soil prepared by tuberculous infection. The toxinic theory (as propounded by Hallopeau) may be excluded, and in this connection it may be noted that tuberculous eruptions are rare in cases of phthisis—cases in which one would expect to note toxins circulating in the blood. In syphilitic eruptions analogous in many respects to the tuberculous cutaneous manifestations occur regularly as a part of the general infection; but in tuberculosis a systemic infection with bacilli is less frequent: the tuberculous infection has a far greater tendency to remain local.

The Bacteriology of One Form of Eczema.—WHITFIELD (*British Journal of Dermatology*, November, 1900), confining his investigations to a single form of eczema, viz., that commonly known as dry eczema (seborrhœa sicca), found in all of twelve cases examined bacteriologically a coccus of variable size, usually occurring in pairs, the cocci joined by their long axes, resembling gonococci; it also occurred in groups and in short chains. This coccus grew freely upon gelatin, which it did not liquefy, producing a wax-

like streak with slightly crenated edges, at first grayish-white in color, later becoming yellow in some cases, in others remaining of the original grayish-white color. On agar the white growth was indistinguishable from the staphylococcus pyogenes albus. On potato the growth was abundant and slimy. The organism was readily stained by the Weigert-Gram method. Although obtained in a pure culture in one instance, it was usually associated with various other organisms. Inoculation experiments upon the author's own person failed to produce more than a trifling disturbance of the horny layer, which healed immediately. The author does not believe the presence of this organism accidental, but thinks a certain predisposition is necessary in order to establish itself. It corresponds almost exactly with the staphylococcus cereus, albus and flavus, and also appears to be identical with the micro-organism found by Merrill in seborrhœic eczema.

An Outbreak of Herpes Zoster.—C. DOPTER (*Gazette des Hôpitaux*, December 5, 1899) records an instance where a slight ¦epidemic of sore-throat occurred in a regiment of soldiers, in several of which cases there appeared herpes zoster, two officers who occupied the same sleeping room being affected, one with intercostal and the other with femoral herpes zoster.

Cutaneous Affections Occurring in the Course of Graves' Disease.—S. E. DORE (*British Journal of Dermatology*, October, 1900) first calls attention to abnormal pigmentation, practically much like that met with in Addison's disease, the writer reporting a case in which the lesions of the skin were at first looked upon as being lichen planus and then as vitiligo. [It is to be noted in Graves' disease that the pigmentation occurs chiefly as an excess of the normal pigment of the body.] The writer also calls attention to the existence of trophic changes in the skin and its appendages, hyperidrosis, erythematous eruptions, œdema, and other conditions resembling eczema, acne, etc. Vasoconstrictors, especially digitalis and ergot, are considered valuable remedies.

Vegetative Dermatitis of Nurslings.—PERRIN (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 10), under the above title, describes three cases of an unusual cutaneous affection observed in nursing children. The disease consisted of plaques of a deep red, sharply limited, more or less regularly rounded, and decidedly elevated above the neighboring parts. They presented a vegetating surface, and were formed by the union of small papulo-pustules. These plaques varied in size from a twenty-centime piece to a two-franc piece, and were situated upon the face, the wrists (usually the extensor surface), and upon the external surfaces of the thighs and legs. The skin around them presented no alteration. In all the cases observed the infants seemed to be otherwise in good health, but in every instance were the subjects of a more or less abundant seborrhœa of the scalp. The disease was an acute one, lasting from fifteen days to three weeks, the duration depending upon whether it was treated or not. Under treatment it rapidly disappeared. Bacteriological examination showed the presence of yellow and white staphylococci, a small bacillus, and a small coccus. The possibility of the drug origin of the lesions was excluded.

Scarlatiniform Erythema of Parasitic Origin.—PASCAL (*Annales de Dermatology et de Syphiligraphie*, 1900, Nos. 8 and 9) reports a number of cases of scarlatiniform eruption occurring in soldiers employed in sifting barley. The eruption was most marked upon the uncovered parts of the body, such as the hands, the forearms, the face, and especially the neck. It was accompanied by severe itching and burning, and in one case some degree of fever was present for the first twenty-four hours. More or less abundant desquamation followed. The affection was found to be due to the irritant dust arising, during the sifting of the grain, from innumerable small butterflies which covered the barley.

The Nature of the So-called Angioneuroses of the Skin.—TÖRÖK (*Archiv für Dermatologie und Syphilis*, Band liii., Heft 2 and 3) concludes, from his own investigations and those of others, that all those characteristics by which one distinguishes certain changes of the skin as angioneurotic in contradistinction to inflammatory changes are not proof against careful criticism. A careful examination of the changes occurring in the skin in urticaria, in erythema multiforme, and in erythema nodosum leads one to include them among the simple inflammations.

A Tumor of Sarcomatous Appearance Produced by Multiple Foreign Bodies.—DUBREUILH and VENOT (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 10) report a case of tumor, situated upon the first phalanx of the right index finger, which followed a wound produced by a piece of oyster-shell. The tumor was the size and shape of an almond and only slightly painful on strong pressure. It was quite soft and fluctuating, but upon puncture nothing but a few drops of blood escaped. A diagnosis of myxosarcoma was made and excision practised. Upon microscopical examination the neoplasm was found to be composed of young connective tissue divided into unequal and irregular lobules, which contained numerous small abscesses. In a certain number of these abscesses numerous small foreign bodies were present, which proved on examination to be fragments of oyster-shell. A certain number of giant cells were observed containing from ten to fifty peripheral nuclei and in some cases a minute fragment of oyster-shell. The authors refer to a somewhat similar case reported by Spitzer.

OTOLOGY.

UNDER THE CHARGE OF
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Ozænous Complications of the Ear.—P. LE CROIX (*Ann. des Mal. de l'Oreille*, etc., November, 1899) has observed in a series of 42 patients affected with ozæna the ear more or less diseased in 30. Most of the ear affections were ambilateral, and consisted in chronic catarrhal otitis media.

Thyroid Treatment of Chronic Deafness.—Influenced by the recommendations of the use of thyroid in the treatment of so-called chronic catarrh of the middle ear, as set forth in the writings of Vulpius, Ewald, Bruhl and Alt, A. BRUCK (*Arch. of Otol.*, October–December, 1899) tried this drug in 40 cases, varying in age from eighteen to forty-eight years. He used the tablets of Merck, and of Wellcome and Burroughs, giving 0.10 gramme three times daily. Thyroidism occurred in 1 case after a few days of this treatment. In 2 others one dose of 0.30 gramme produced thyroidism, and in 1 case, a corpulent woman, one or two doses produced such profound thyroidism that all treatment was stopped permanently. Bruck concludes : " Personally, I must say that from the employment of thyroid, no matter for how long a time, I have not yet seen a single case of positive improvement in the hearing."

Primary Inflammation of the Mastoid Process.—T. HEIMAN (*Ann. des Mal. de l' Oreille*, November, 1899) after reviewing a number of cases of so-called primary inflammation (periostitis, osteitis, etc.) published by both older and more modern writers, and also recording several cases in his own practice that might have been called by other observers primary mastoiditis, but which he considered as entirely secondary products, concludes that " primary mastoid periostitis is, without doubt, a disease appearing very *rarely* under a distinct clinical form. Primary osteitis of the mastoid exists theoretically, but all those that report its occurrence consider it as an exceptional disease, it being admitted that the cases heretofore described as such a disease rest on error in diagnosis, and that aurists of authority doubt its existence." So far as concerns Heiman's own observations in a large number of patients, he has been unable to find one single case which he could, without hesitation, say was one of true primary mastoid osteitis, and he asserts that from his experience primary mastoid osteitis does not exist. Cases heretofore diagnosed as such a malady were in reality secondary to disease of the external or of the middle ear.

So-called Dangerous Temporal Bones.—L. KATZ (*Archiv. f. Ohrenh.*, November 20, 1899) calls attention again to the fact, also pointed out by L. Trautmann (1898), that " when the angle formed by the mastoid surface and the posterior wall of the external auditory canal is obtuse, the sinus lies far forward," and is in danger of being wounded in mastoid operations. The more obtuse the angle the further forward lies the sinus.

Epidemic Cerebro-spinal Meningitis with Ambilateral Purulent Otitis Media.—S. VON STEIN (*Archives of Otology*, October–December, 1899) has reported a case of epidemic cerebro-spinal meningitis with ambilateral purulent otitis media in a child of five years, in which both mastoids were trephined and the transverse sinuses exposed and explored by aspiration. The mastoids were filled with " stringy mucus and pus," but the sinuses were free from pus or thrombus. Recovery in all respects occurred in the course of a month. The purulent oitis media in this case may be regarded as part of the intercurrent acute bronchitis. We cannot agree with the opinion advanced by Von Stein, that " possibly in the future the mortality of such cases (cerebro-spinal meningitis), which yield to no other treatment, may

be materially reduced by early opening of the cerebral cavity," nor that "perhaps bilateral opening of the mastoids in typical cerebro-spinal meningitis will act as thoroughly as opening the abdominal cavity in tuberculosis." In our opinion this child recovered from cerebro-spinal meningitis in spite of the mastoid operations and not in consequence of them.

Cold in Acute Otitis and Mastoiditis.—J. O. TANSLEY (*Transactions of the American Otological Society,* July, 1899) is opposed to the use of cold in acute otitis media and in acute mastoiditis, as it may dull the pain too thoroughly and act as a mask of the true state of disease in these parts, thus leading to delay in performing needed operations.

Mastoid Operations.—A. LUCÆ (*Archiv. f. Ohrenh.*, November 20, 1899), while admitting that in many cases he has by the mastoid operation in its various forms cured chronic suppurations in which all other methods failed, also is assured that, after four years' experience in many thousands of cases, he has cured many cases of chronic suppuration of the ears with irrigation with formalin solution (1–1000) in warm water that otherwise would have required a mastoid operation. Furthermore, if a faithful trial of formalin fails to cure a chronic otorrhœa, Lucæ considers such a failure as an indication for a mastoid operation. He believes one should be prouder of saying, "I have cured so many cases of otorrhœa without operation," than of saying, "I have performed so many mastoid operations for the cure of purulent otitis media."

Excision of Ossicles.—GRUNERT and ZERONI (*Archiv f. Ohrenh.*, August 3, 1899) maintain, rightly, we think, that excision of the hammer and incus for the cure of chronic purulent otitis media has been unjustly superseded to a great degree by the so-called radical operation on the antrum and mastoid. Observation of a large number of patients has led them to conclude that excision of diseased ossicles will usually cure the chronic purulency and prevent mastoiditis and its sequelæ, and they have frequently been called upon to perform mastoid operations that would never have been needed if excision of the ossicles by way of the auditory canal had been performed in time.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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On the Growth of Carcinomata of the Skin and Mucous Membranes.—LOHMER (*Ziegler's Beiträge*, 1900, xxviii., 372).

The theory that carcinomata arise by the epithelium growing down into the underlying tissues rests chiefly on the works of Thiersch and Waldeyer, and for many years this view has been generally accepted. Recently, how-

ever, the histogenesis of carcinoma has become the subject of much discussion, owing to a theory advanced by Ribbert that carcinoma does not owe its origin primarily to an increased proliferative energy of epithelial cells, which enables them to invade connective tissue, but to a separation of a group or mass of epithelial cells from their normal relations. This separation, according to him, is due chiefly to a growth of connective tissue which surrounds and cuts off some of the epithelial cells, which then, after their separation, acquire the proliferative power of carcinoma cells.

This theory of Ribbert's has met with a good deal of opposition, partly because it does not agree with the view held by most investigators that there occurs a primary morphological and biological change in the epithelial cells which renders them capable of malignant growth; partly because it is not in harmony with the interpretation heretofore put on a whole series of the most different histologic carcinoma—preparations which have been looked upon as typical pictures.

These pictures and the interpretation of them recur in nearly all of the publications directed against Ribbert's views. The most important of them are the so-called "transition pictures," namely, what is seen at the edge of young and old carcinomata, where the normal epithelium merges, without any distinct line of demarcation, into the fully developed carcinoma.

Ribbert defends his position by claiming that false conclusions have been drawn from these pictures. He interprets them otherwise: The carcinoma may have developed in the middle of a papillary tumor or of an adenomatous polyp—such a combination is not so very rare—or the pictures seen may be due to the growth of the connective tissue leading to papillary projections of the skin and to modifications of glands of mucous membrane; a third interpretation is that the tumor, which grows not only downward and laterally, may also grow upward and become joined to the epithelial covering; in such cases it would look as though the surface epithelium had grown downward. This latter point is unquestionably true, and is accepted by all writers.

Lohmer examined twenty-three carcinomata of the skin and a number from mucous membranes, many of them by means of serial sections. On the basis of his own work and that of others he strongly opposes Ribbert's theory. Eight carcinomata of the lip, for example, showed a marked downward growth of the epithelium, in most cases to the muscle layer. As a rule, it extended as broad, thick masses into the connective tissue. In seven of the cases there was a gradual merging of the normal epidermis into the tumor. In all of these cases a secondary junction of the normal downward projections of the epidermis with extensions of the tumor could be ruled out, as could also the assumption that the carcinoma developed in the middle of a papilloma or that the epithelial processes were stretched by a growth of connective tissue. The writer believes that the infiltration of the cutis with round cells is secondary, and follows the changes due to the epithelial invasion.

In carcinomata of the mucous membranes he found an upward growth of the tumor and union with the epithelium rather more frequent than in carcinoma of the skin.

The writer believes that Ribbert's theory does not fit all cases, because in the greater number of the carcinomata which he examined a direct growth

of the tumor into the depths and a spread at the periphery could be demonstrated. Long, branching masses of epithelium could be followed without any break from the surface epithelium directly into the underlying connective tissue. At its periphery the tumor spreads by gradual involvement of the neighboring epithelium, which then grows directly downward into the underlying connective tissue. It is necessary to return, therefore, to the assumption that the starting-point of a carcinoma is to be found in a primary proliferative energy of epithelial cells. The cause of this proliferative energy is still unknown.

Gland-like Carcinoma of Epidermic Origin.—KROMPECHER (*Ziegler's Beiträge*, 1900, xxviii., 1).

Braun, in 1892, described certain tumors of the skin which differed clinically and histologically from the ordinary epidermoid carcinomata, and which, according to him, could not be derived from the glandular structures of the skin. He declared them to be endotheliomata.

According to Krompecher, the diagnosis of endothelioma can be made only when the origin of the tumor masses from the lymph endothelium of the larger lymph spaces can be directly followed or when a carcinoma-like tumor is found in places such as bone and lymph nodes, where epithelium is lacking and the structure of the suspicious tumor corresponds to that of tumors already firmly established as endotheliomata.

Braun was not able to demonstrate the origin of the tumors from endothelial cells, and the histological picture does not at all correspond to the picture of proved endotheliomata. He based his diagnosis on the difference of structure as compared with ordinary epidermoid carcinomata, on the absence of epithelial pearls, and especially on the lack of any connection between the tumor and the skin.

Krompecher believes that these tumors are not endotheliomata, but carcinomata. He bases his arguments and opinions on a study of thirty-three cases, of which twenty-one are described in detail. The tumors were derived from cheek, forehead, breast, eyelid, nose, back, tongue, cervix uteri, lumbar region, and ear.

In fourteen of the twenty-one cases he was able to demonstrate by means of serial sections the connection of the tumors with the surface epithelium and thereby prove their epithelial character.

The striking feature of these tumors is their microscopical structure. While the epidermoid carcinoma is composed of the cylindrical cells of the stratum Malpighii and of polygonal prickle cells, which by cornification give rise to the epithelial pearls, the group of tumors under consideration is distinguished by the fact that only the cylindrical layer of the stratum Malpighii grows; the epithelial cells constantly retain their embryonic character, and the nests of tumor cells consist simply of long, cylindrical cells, which stain intensely. Under a high power such a tumor often looks strikingly like a spindle-cell sarcoma. Inside of the cell nests no cornification or formation of epithelial pearls can be found.

The microscopical picture of these growths varies greatly according as the cells grow as solid masses, in narrow " meandering " ribbons, or lining canals and cysts. Combinations of these various forms occur with each

other and also rarely with the ordinary form of epidermoid carcinoma. The writer recognizes six different types, but it is not necessary to consider them in detail here.

Secondary degeneration of the connective tissue stroma is frequent and quite characteristic. The degeneration may be hyaline or myxomatous.

Krompecher believes that the gross and microscopical appearances and clinical features of this class of tumors are sufficiently peculiar and characteristic to establish them as a separate group of carcinomata, to which he gives the name " carcinoma epitheliale adenoides."

Suppurative Myelitis in a Case of Bronchiectasis.—CHIARI (*Zeitschrift f. Heilkunde,* 1900, xxi., 351) sums up the brief literature of suppurative myelitis, and adds a case which came under his observation. But fourteen cases in all have been published : of these, three were traumatic in origin, and three were due to direct extension from lesions outside the cord. Of the remaining eight cases, three occurred as metastatic lesions in cases of bronchiectasis.

In the case reported by the writer, beside meningitis of the brain and cord, abscesses filled with thick yellowish-green pus were found in the cerebellum and in three different parts of the cord.

In the lower lobes of the lungs were numerous bronchiectatic cavities up to the size of hazel-nuts, and the bronchi showed numerous cylindrical dilatations.

Coverslip preparations from the pus in the abscesses and in bronchiectatic cavities showed the micrococcus lanceolatus, and the same micro-organism was obtained in cultures.

Sections through the wall of the abscesses in the cerebellum and in the cord showed, however, beside the micrococcus lanceolatus, numerous clumps of fine, branching threads which stained by Gram ; they lay partly within bloodvessels, partly in the perivascular lymph spaces. The micro-organism was evidently a streptothrix and closely resembled the actinomyces. It was not obtained in the cultures. Evidently it had reached the nervous system metastatically from the bronchiectases through the circulation.

The case suggests, the writer thinks, that it would be well to examine the bacteria present in cases of bronchiectases ; the actinomyces may be found because such a large proportion of the cases of myelitis are associated with bronchiectasis, and because the actinomyces is the micro-organism which seems most frequently to give rise to metastatic lesions in the central nervous system.

In favor of this view the writer mentions a second case of his in which there were both bronchiectasis and abscess of the brain with secondary suppurative meningitis. Both in the bronchiectatic cavities and in the abscess of the brain a streptothrix was found resembling in all respects the micro-organism of the case reported.

Internal Pachymeningitis.—MELNIKOW-RASWEDENKOW (*Ziegler's Beiträge,* 1900, xxviii., 217).

Jores and his students have claimed that idiopathic pachymeningitis is a pathological process which has its seat in the capillary layer, perhaps also in

the bloodvessels generally, of the dura, and which gives rise to a new forma-
tion of capillaries and to constantly recurring hemorrhages.

As this is contrary to the generally accepted view, the writer reinvestigated
the subject.   He studied, first, the normal structure of the dura, using par-
ticularly Weigert's elastic tissue stain.   In the inner of the two layers of the
dura could be distinguished from within out : 1. A single layer of epithe-
lium, which covers the inner surface.   2. A hyaloid, fenestrated, elastic
membrane, which varies much with age and with the individual ; it is absent
at birth, is well marked in early adult life, and is thick in old age.   3. The
inner capillary network.   4. A layer of connective tissue mixed with elastic
fibres.   According to the results of histological and embryological investiga-
tions, the dura mater is a peculiar formation and has nothing in common
with the pleural and peritoneal serosæ.

The writer then studied twelve cases of pachymeningitis.   Of these, three
only showed proliferation of the epithelial cells on the inner surface of the
dura, with some exudation of fibrin and leucocytes.   The important point
was that the process occurred on the surface of the internal elastic mem-
brane.   Later, organization of this exudation takes place ; thin-walled capil-
laries grow out from the capillary layer through spaces in the internal elastic
membrane.

It is characteristic of this process for hemorrhages to take place from these
newly formed bloodvessels ; they often burst, and then the blood pours out
into the delicate, loose connective tissue.   The exuded blood is rapidly
absorbed, as is shown by the numerous pigment masses of various sizes.
The pigment lies partly in cells, partly out of them, and is heaped up espe-
cially around the bloodvessels in the deeper layers close to the limiting
elastic membrane.

There may be repeated hemorrhages ; then there are several layers of con-
nective tissue showing different stages of development ; the oldest is next to
the internal limiting membrane.

The general view that the pathological process is an inflammation, with
hemorrhage following as a complication, is accepted by the writer.   The less
accepted view of a hemorrhage on the surface of the dura followed by inflam-
mation may occasionally be true.

In the origin of pachymeningitis in man toxæmias play an important part.
They produce the histological changes in the dura, in consequence of which
the peculiar inflammatory process develops.

The Pigment in Brown Induration of the Lungs.—NEUMANN (*Virchow's
Archiv*, 1900, vol. clxi., p. 422) has recently been investigating the ques-
tion whether the well-known yellow to reddish-brown pigment which occurs
in the lung in chronic passive congestion, and which gives the iron reaction,
can lose this power to give the iron reaction and change to a melanotic pig-
ment.   The problem was taken up because the results obtained by various
investigators of this subject do not agree.

In his investigations Neumann found along with carbon, which is never
lacking, only one other pigment, and that differed in no way from the
hemosiderin which arises in other parts of the body from extravasations.
It has a more or less saturated yellow, yellowish-brown, or reddish-brown

color, without any gray, blackish, or black tinge ; often it appears colorless, or at least of an extremely pale yellow, and it always gives a strong iron reaction.

Examination of fresh tissues is advised ; but tissues hardened in alcohol or in Müller's fluid give good results. Artificial stains are for the most part unnecessary and in part disadvantageous. It is best to compare parts of the lung which macroscopically show no carbon with other parts containing much of it. Where carbon is wanting the usual masses of hemosiderin are found, chiefly within the large " heart-failure cells " in the alveoli. Where much carbon is present the masses of pigment are darker in color, and lie mostly in the connective tissue stroma ; the low power of the microscope shows all transitions from yellow hemosiderin to black carbon. High power shows that each dark pigment mass consists of a central black nucleus surrounded by a yellowish mantle of varying thickness. The unquestionable interpretation of these masses is that they are particles of carbon surrounded by hemosiderin. In this way arise the pigment granules first described by Virchow and later forgotten, namely, one-half or one-third black and the rest yellow or red.

Against the view that these central black bodies are due to a secondary melanotic change of the substance of the hemosiderin, he urges the facts that the dark nuclear formations are usually sharply limited at the periphery and show no zone of transition, and that several dark nuclei may lie within one pigment mass.

He believes that the retrograde changes in the pigment, instead of beginning in the middle of a mass and proceeding outward, begin at the periphery, and he regards the colorless border around the carbon particles as the last stage in the metamorphosis of the hemosiderin.

He believes, further, that the hemosiderin is deposited on the carbon from hæmoglobin in solution, and that red-blood globules cannot turn to yellow and brown granules without solution taking place.

The Histological Changes in Striated Muscle Adjoining Malignant Tumors.—FUJINAMI (*Virchow's Archiv*, 1900, clxi., 115) studied the effects produced on muscle-tissue by twenty sarcomata and seventeen carcinomata.

In general the two classes of tumors may be said to invade muscle-tissue in much the same way. They may infiltrate between the separate muscle-fibres, they may press against them as a mass, or they may be separated from the fibres by bands of connective tissue, thus affecting the muscle-fibres indirectly only.

The infiltration takes place not only through the tissue spaces and the lymph and bloodvessels, but also through the sarcolemma sacs. This invasion of the sarcolemma sac and extension through it is much more common with carcinoma than with sarcoma. It is especially marked where the infiltration of the muscle is parallel with the muscle-fibres. With the sarcomata it has been observed only in the round-cell variety. The invasion or non-invasion by the tumor-cells of the sarcolemma sac depends on the biological relation of the tumor-cells themselves, on the direction of their growth, and on the nature of the changes in the muscle-substance.

The changes which take place in the muscle-fibres as the result of the invasion of muscle tissue by the tumor are manifold. All the possible degenerative changes which occur in the various lesions of muscle may be present, and they may occur very irregularly in the individual fibres. The commonest form is simple atrophy, but the most interesting are (*a*) the multiplication of the nuclei, (*b*) the irregular or ampullar atrophy, and (*c*) the formation of giant-cells.

(*a*) Ordinarily the muscle nuclei disappear as the muscle-fibre atrophies. In other cases, however, they appear very active, increasing greatly in number (the writer counted 153 in one fibre), chiefly, perhaps exclusively, by direct division. They may form single or double rows, or (*c*) may collect in clumps which on cross section appear like giant cells.

(*b*) Sometimes the tumor cells press against the side of the muscle-fibres causing irregular atrophy which gives an ampullar or beaded appearance to the muscle-fibres.

One point to be insisted on is that all the changes which occur in regenerating muscle, and which are looked upon as regenerative in nature, occur practically in the same form at the periphery of a malignant growth where there can be no question of regeneration. Apparently the muscle-fibre can show at a certain stage of regressive change an appearance similar, or nearly similar, to that seen at the beginning of its development; it is necessary, therefore, to guard against judging from microscopical examination only whether regeneration or degeneration is present.

In many cases there occurs at the edge of the tumor, as the result of reaction on the part of the tissues, a change in the interstitial tissue of the muscle due to round-cell infiltration, growth of the connective tissue, and growth of the intima of the vessels. These all exert an effect on the muscle-fibres. A round-cell infiltration of the perimysium at the edge of the tumor is, as a rule, more frequent and more marked with carcinoma than with sarcoma.

Two conclusions drawn by the writer cannot be accepted without further proof, namely, that cell formations may arise from altered muscle-fibres and take part in the formation of tumor-cells, and that the muscle-fibres may be converted into connective tissue.

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THE PROTOZOON OF CANCER.

A PRELIMINARY REPORT BASED UPON THREE YEARS' WORK IN THE NEW
YORK STATE PATHOLOGICAL LABORATORY OF THE UNIVERSITY
OF BUFFALO.[1]

By HARVEY R. GAYLORD, M.D.,
OF BUFFALO,
DIRECTOR OF THE LABORATORY.

PART I.

IN January, 1899, at a meeting of the Medical Society of the State
of New York, in Albany, the writer made a statement regarding certain
observations made by himself in the State Pathological Laboratory.
As these remarks appear in the *Transactions* of this society, they are as
follows :

"Others have found organisms in cancer and have explained them as
protozoa. Sanfelice and all observers of alleged parasites in cancer
have noted the great variability of these forms in the tissue. As a
result of our preliminary work, we think we have discovered the reason
for this. We owe to Busse the knowledge of the fact that all staining
methods are unreliable for such research. We therefore worked with the
fresh methods, although we found at first that it was very confusing. We
have discovered in all the cases of cancer so far examined that by fresh
methods the organisms can always be found. These bodies resemble fat
in the fresh state. It was only when we applied the ether test and the
osmic-acid test that we discovered that they were not particles of fat.

We next discovered that we could crack their edges with the cover-glass. There was no reason, even then, to believe that these might not be unusual forms of fat. We next injected them into the abdominal cavities of animals. Most of the animals developed peritonitis, and large quantities of these bodies could be obtained from the peritoneal fluid. In the last few days we have observed the round form develop under the cover-glass. They can be found in every cancer if properly sought for, and can be injected into animals and be recovered. They also change their form.

" We would not have made these statements were it not for a remarkable experiment at the beginning of this work. Dr. Park had a case of abdominal carcinosis. An exploratory incision was made, and a quantity of the serum from the abdominal cavity was given to me for investigation. It was in this fluid that we first found these bodies, and observed that they did not increase. After the fluid had been kept in the thermostat for three weeks we could still find the same bodies. They were then injected into the jugular vein of a guinea-pig, and three weeks and a half afterward, on killing the animal, we found a primary adenocarcinoma of the lung. This experience, we may say, is unique. The fluid had been carefully sedimented, and the fluid for inoculation taken from the top, so that it was not at all probable that cancer cells were actually introduced into the animal. In the case from which the fluid was taken the growth was a colloid carcinoma, but this was not the form of cancer which developed in the inoculated animal. It is also to be noted that carcinoma in the guinea-pig is extremely rare."

Since the period of this statement our attention has been principally turned to an investigation into the nature of these parasites, in attempts to demonstrate them in the tissue, and in attempts to cultivate them. The following is a detailed report of the experiment:

CASE I. — S. N., a male, aged fifty-one years, a patient of Dr. Park. He was seen at his home, and presented physical signs of a large intraperitoneal tumor. The patient was removed to the Buffalo General Hospital, where an exploratory operation was performed by Dr. Park on August 12, 1898. Preparations had previously been made to collect aseptic fluid in sterile tubes and flasks. Dr. Park opened the distended abdomen with the usual aseptic precautions, and a sterile tube was inserted in the opening and about half a litre of the fluid was permitted to flow into a flask. Then three test tubes in succession were held beneath the running tube, and the remainder of the fluid was drawn off in separate flasks. The fluid which was removed from the peritoneal cavity was slightly blood-stained, but did not coagulate. The three tubes, labelled a, b, and c, were immediately placed in the writer's inside vest-pocket and were carried warm to the laboratory, where they were placed in the thermostat. The flasks were not treated in this manner, but were allowed to fall to the room-temperature and were not incubated. Inoculations upon bouillon, sugar-

water, and acid sugar-water, as well as agar and blood-serum, were at
once made from all three tubes. A careful microscopical examination
was likewise made of the peritoneal fluid, which was found to contain
a few blood-corpuscles and some pale spherical bodies, in size varying
from 2 to 10 micromillimetres. They were homogeneous, of pale, yel-
lowish-green color, and at first were mistaken for fat droplets, although
on closer examination their refractive index was seen to be too low.
They were likewise resistant to ether, even when the fluid or tissues
containing them were first treated with potassium hydrate, then cen-
trifuged, washed in water, treated with 60, 80, 95 per cent., and abso-
lute alcohol, washed in absolute alcohol and ether, equal parts, and
then placed in an ether extractor for four days. When treated with
osmic acid they failed to give the black reaction which characterizes
fat. Attempts to stain them were partly successful, and it was found
with cover-slips fixed by heat that although the bodies were greatly
deformed by the process a certain number of them could be stained
with carbol-thionin or the usual aniline dyes. Some of these bodies,
though not very numerous, contained granular material, which showed
marked Brownian movement. The tubes were examined from day
to day, and we were able to demonstrate that these spherical bodies
gradually increased in size, became more indefinite, and gradually lost
their yellowish-green color. As they increased in size they apparently
became more fluid and commonly sent out pseudopods and long projec-
tions. Fine colorless granules appeared in the protoplasm, and in some
a delicate nucleus could be made out. Ultimately the larger forms of
the organism became transformed into what appeared to be large sacs
containing highly refractive granules and small spherical bodies, not
unlike the free spherical bodies above described. The membrane of
the sac was demonstrable as a pale colorless structure. The diameter
of these sacs was on the average about 20 to 25 micromillimetres, or
the size of a good-sized epithelial cell.

On August 19th 3 c.c. of tube *a* were injected into the peritoneal
cavity of a female dog. On August 20th a fine surface growth was
noted in tubes *a* and *b* of a small organism about the size of a coccus,
which presented a peculiar bud-like growth and which resisted all
attempts at cultivation. On August 25th 3 c.c. of fluid from tube *c*
were injected into the jugular vein of a full-grown guinea-pig (Pig 1).
On August 26th 4 c.c. of the same tube were injected into the peritoneal
cavity of a second guinea-pig (Pig 2).

On August 29th the patient, who since the operation had not been
doing well, died. Unfortunately the autopsy was begun by the attend-
ing physician, who opened the abdominal cavity and had already con-
taminated its contents before the peritoneal fluid was collected.

The following is extracted from the autopsy notes:

Autopsy four hours after death. Body of a well-formed, middle-sized
man. Muscular structure well developed, skin pale, fat scanty. Peri-
toneal cavity contains a large amount of serosanguineous fluid. The
peritoneum is greatly thickened, contains a large number of translucent
vesicles, which are likewise scattered over the entire peritoneal surface,
including that of the liver and the under surface of the diaphragm.
The pelvic cavity is entirely filled with these gelatinous masses. On

removing the enlarged omentum it is found to measure 95 cm. in the long axis. Its greatest thickness is 12 cm. After removing the omental tumor the intestines are apparently free, except a large encapsulated mass of gelatinous material near the ileocæcal junction, apparently involving the lumen of the intestine. Intestines are removed without difficulty, when the tumor in the neighborhood of the cæcum is found to be firmly attached to the peritoneal wall, is apparently of a cystic nature, and contains a mass of gelatinous material. On opening the intestine no connection between the lumen of the cæcum and the tumor mass can be detected. The tumor mass, however, involves the appendix, which is obliterated. The spleen is dark red in color, and weighs four ounces. The right kidney is embedded in a mass of gelatinous material. The capsule of the kidney strips easily, the diameter of the cortex is 5 mm., of grayish-rose color. The papillæ are anæmic. Kidney pelvis unchanged. Left kidney same as right. The gelatinous material in the pelvis fills in the space between the rectum and bladder. The entire under surface of the diaphragm is thickly infiltrated with gelatinous vesicles. The liver is adherent to the diaphragm, and the suspensory and round ligaments are thickly infiltrated with gelatinous material. The gall-bladder is distended ; the gall-duct patulous. On section the liver presents a typical nutmeg appearance, and the substance of the organ is apparently not at any point invaded by the gelatinous material. On opening the thoracic cavity the lungs extend well forward ; pericardial sac contains a small amount of clear, straw-colored fluid. On opening the pericardium the heart is somewhat small, the heart muscle of a pale, brownish color. In the right ventricle is a large rose-colored clot, which extends into the pulmonary artery. The lungs contain a normal amount of air, show grayish and red mottling, but no evidence of metastases. Projecting into the left pulmonary artery is a large thrombus, adherent at various points and extending into the branches of the pulmonary artery. The bronchi contain frothy exudate. The right lung presents the same characteristics as the left, and the right pulmonary artery likewise contains a thrombus. The transverse and descending aorta shows a moderate amount of sclerotic change. The bladder and genito-urinary tract are free from abnormalities. The omentum and the cystic mass attached to the cæcum were removed and preserved for further examination.

Anatomical Diagnosis. Colloid carcinoma of the peritoneum ; thromboses of the pulmonary arteries ; atheroma of the aorta ; brown atrophy of the heart muscle.

The microscopical examination of the fresh material from the vesicles of the tumor shows it to consist of a finely granular or homogeneous material, containing a considerable number of degenerated epithelial cells and the small spherical bodies noted in the peritoneal fluid. Examination of the peritoneal fluid from the cadaver showed that it likewise contained large numbers of the various forms of the organism. Portions removed from different parts of the tumor were hardened in various hardening reagents. The examination of the hardened and stained sections shows the tumor to be an adenocarcinoma of the omentum, which has undergone advanced colloid degeneration. The gelatinous vesicles show the typical appearance and characteristics of colloid carcinoma. They penetrate between the muscle fibres of the diaphragm into the layers of the capsule of the liver and involve the

PLATE I.
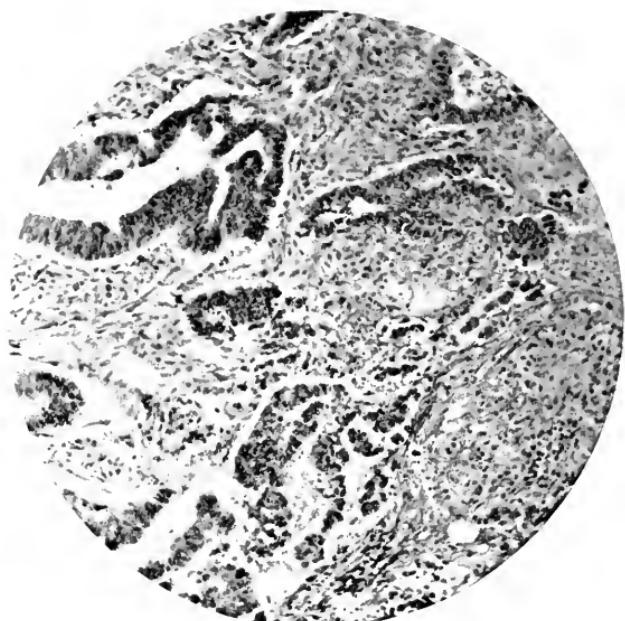
1.

Adenocarcinoma. Case I. (M. P.) (H. E.)

2.

Colloid mass from under surface of liver. Case I. (M. P.) (Methylene blue.)

entire thickness of the omentum. The muscle fibres or connective tissue structures are forced apart by the gelatinous material.

In the neighborhood of the cæcum the colloid degeneration of the intestine is not so marked as in the other portions. Here the epithelial structures may be seen invading the abdominal wall and the mass of adherent structures which surround the growth. The description of a section from the growth in the neighborhood of the cæcum and one from the colloid portions of the tumor will include the principal characteristic features.

Slide 2. A section taken from the region of the primary tumor, hardened in alcohol, stained with Delafield's hæmatoxylin, includes a portion of the subperitoneal fat and the wall of the tumor. The connective tissue stroma of the section is thickly infiltrated with round cells. In the deeper portions of the section are a number of muscle fibres, likewise infiltrated with round cells. Extending through the entire thickness of the section are large, epithelial, glandular structures and nests of isolated cylindrical epithelium. (Plate I., Fig. 1.) Near the surface of the tumor these glands are broken up, and the epithelium is scattered through the stroma without definite arrangement. The cylindrical form of the epithelium is likewise changed, and here and there concentric structures closely resembling epithelial pearls may be noted. In the large glandular structures the epithelium is commonly several layers deep. The nuclei are large, deeply-stained, of irregular form and irregularly placed. The protoplasm of the cells stains deeply. Karyokinetic figures are uncommon. When examined under high power a number of the cells are found to contain typical Plimmer inclusions and the various forms beginning with small spherical bodies known as Russell fuchsin bodies and certain deeply stained bodies within the nuclei and protoplasm of the cells, which we now recognize as the younger forms of the parasite.

A portion of the tumor covering the under surface of the diaphragm, the surface of the liver and the peritoneal surface, which shows the typical vesicle formation characterizing this growth, reveals, on microscopical examination, the typical appearances and structure of an adenocarcinoma in an advanced stage of mucoid degeneration. The description of a single slide will suffice.

Slide 10, from material hardened in Flemming's mixture, embedded in paraffin and stained with iron hæmatoxylin Bordeaux red, through a large mass of gelatinous material from the under surface of the diaphragm. Tumor is divided into large vesicular structures, which, under the microscope, are divided up into smaller vesicles. These are filled with coagulated material, in which are embedded a number of epithelial cells in various stages of mucoid degeneration. The nuclei of these cells are somewhat smaller than those seen in Slide 1. In some of the vesicles the cells are of a typical cylindrical type, arranged in rows in the usual manner found in adenocarcinoma. Nearly every cell contains a large vesicle apparently filled with mucoid material. In some of the vesicles the cells are scarcely discernible, only occasional chromatin granules and indefinite masses of protoplasm marking the site where the cells once existed. The stroma is thin, contains but few nuclei, and occasionally, at the intersections, a few fat cells and a well-defined round-celled infiltration. The nucleus of nearly every cell contains a deeply stained body (nuclear infection). The occasional

vacuoles filled with mucoid material present an entirely different appearance from possible Plimmer inclusions.

Slide 12, taken from a mucoid portion of the tumor, near the site of the original tumor. Material hardened in sublimate, stained with methylene-blue. The tumor is made up of large and smaller vesicles filled with mucoid material. Within the vesicles may be seen the remnants of adenomatous structures, the epithelium of which shows marked mucoid degeneration. Under high power the cells of this portion of the tumor are found to closely resemble the adenomatous structures seen in Slide 2.

Slide 13. Section of a large mucoid mass removed from the under surface of the liver, stained with methylene-blue. The vesicles of this section contain deeply-stained masses of mucoid material. These are sharply delimited against the underlying structures. Embedded in the material are the fragments of degenerated epithelium. No well preserved epithelial elements are present. (Plate I., Fig. 2.)

Cultures made from different portions of the tumor were all bacteriologically negative. The usual forms of bacteriological culture media were employed. These were placed under aërobic and anaërobic conditions.

On September 6th the following note appears in the *Laboratory Journal:* " Guinea-pig No. 1 shows distinct evidence of listlessness and does not appear well. The animal sits in the corner of its cage and does not move about." On Wednesday, October 14th, both Pigs 1 and 2 were killed.

The following notes taken from the autopsy of Pig 1 will be of interest:

Inspection of the site where the injection of the serum was made in the right jugular shows that the superficial wound has healed, and at the point of ligation the jugular vein is transformed into a fibrous cord. On opening the thoracic cavity nothing of interest is to be noted until the lungs are reached. These are found to contain a normal amount of air. The pleura appears slightly injected. On opening the pleural cavity cultures are made from the lung surface. The lungs contain a large amount of pigment and show areas of venous engorgement with occasional minute hemorrhages beneath the pleura. After removing the lungs and incising them, both are found to contain a large number of minute nodules varying from the size of a pinhead to one larger than the rest, about the size of a grain of rice. These nodules are white, of greater consistence than the lung tissue, and somewhat elevated above the cut surface. Careful examination shows them to be located near or surrounding the small bronchi. The small areas of hemorrhage noted on opening the thoracic cavity are found to be confined to the region immediately beneath the pleura. On examining the abdominal organs the stomach is found to be empty, the intestines collapsed, the bladder widely distended with urine, and the cortex of each kidney of a deep red color. The capsules strip with some difficulty, and the stellate vessels directly beneath the capsule are slightly injected. The spleen is somewhat enlarged, shows a mottled, bright-red, and reddish-brown appearance. On incision the follicles are unusually large and stand out plainly against a background of deep red and reddish-brown pulp. Fresh microscopical examination of the heart's blood shows it to contain,

PLATE II.
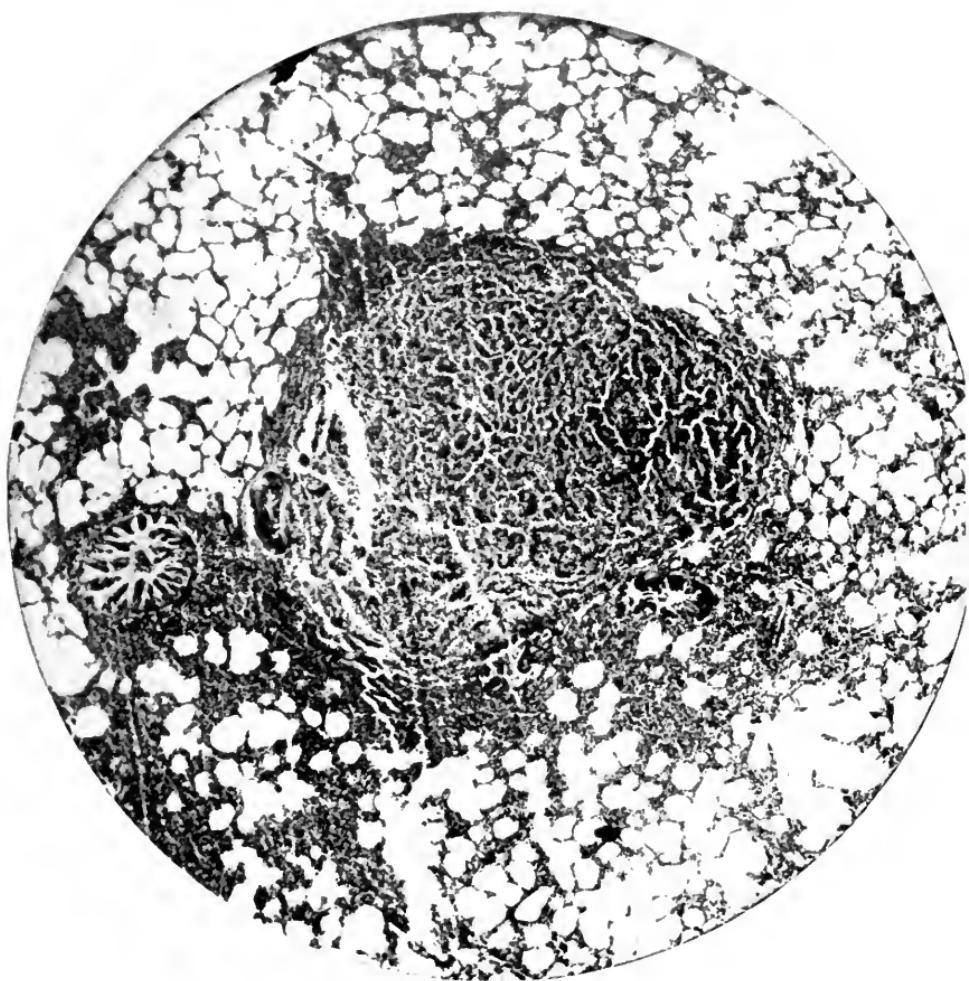
Section of Lung, Pig I, including the largest nodule. Primary Adenocarcinoma following injection of protozoa in peritoneal fluid of Case I. (Low Power.)
(Hæmatoxylin Eosin.)

PLATE III.
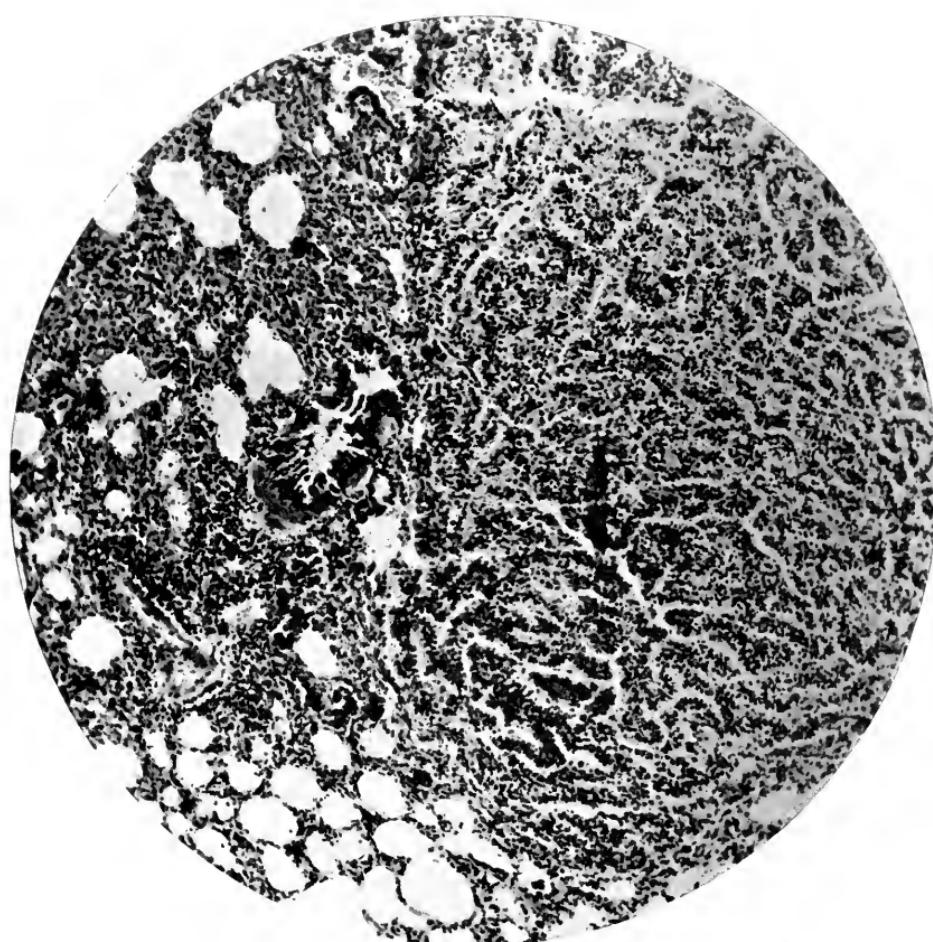
Margin of nodule (Plate II) showing origin of tumor from
epithelium of bronchus. (Middle Power.)

beside the normal constituents of the blood, a large number of small, spherical, highly refractive bodies closely resembling fat, which in size and appearance are identical with those found in the original fluid with which the animal was injected. Aside from the minute white nodules in the lung, the pigmentation and enlargement of the follicles of the spleen and lymph nodes, and the injection of the kidneys, the remaining organs of the animal show no abnormalities. The lungs were hardened in formalin.

A large number of sections were cut, some of which include the largest nodule above mentioned. On examination with low power of a section stained with Delafield's hæmatoxylin, the nodule is readily found by the deep staining of the structures which compose it. On closer scrutiny, even with low power (Plate II.), the structure presents the appearance of a rapidly-growing nodule possessing a definite structure. The lung trabeculæ in the immediate neighborhood, especially in a portion adjacent to a bronchus, shows marked interstitial thickening. In the immediate neighborhood is a section of a middle-sized pulmonary vessel and a good-sized bronchus. The remains of a collapsed bronchial artery are seen just at the periphery of the growth. The alveoli of the lung show marked concentric flattening about the periphery of the nodule. A few yellowish-brown spots indicate the presence of pigment within the growth. Under high power the structure of the nodule becomes distinctly apparent. (Plate III.) It is made up of epithelial cells arranged in a characteristic manner upon a delicate connective tissue stroma. This forms the axes of longer and shorter papillary projections, which are closely packed together. Upon these are arranged single and double rows of cylindrical epithelium. At the periphery of the growth the alveoli of the lung are concentrically flattened, and the structure of the adenoma merges gradually into the structure of the lung trabeculæ. In one or two points the adenoma is spreading into the surrounding tissues, and in these localities the trabeculæ of the lung show a marked thickening and a distinct round-celled infiltration.

Under still higher power the nature of the epithelial cells may be more distinctly observed. They are fairly uniform in size, the cell protoplasm is abundant and palely stained. The nuclei are oval, are placed near the base of the cells, and stain deeply. The cells are cylindrical in form, but at the periphery, where the compression is great, they show evidence of considerable distortion. Included within the tumor are a number of cells containing coal pigment, and in the stroma are a few capillaries containing blood cells. In the neighborhood of these capillaries are occasional connective tissue cells loaded with hæmatogenous pigment.

The bronchial vessel lying directly at the margin of the growth is collapsed; the intima shows proliferative changes; the media is somewhat thickened. The adjacent pulmonary vessel is surrounded by a thick layer of cells, which apparently spring from the adventitia of the vessel. These are of the typical round-celled variety, and in certain portions are accumulated in groups, forming well-defined nodules. Careful scrutiny of the surrounding pulmonary tissue, especially in that portion in which there is great thickening of the trabeculæ, shows this change to be due to a proliferation of the connective tissue stroma of the lung. A large number of cells closely resembling the *epithelial*

cells of the lung are mixed with these. A certain number of the last-mentioned elements contain deposits of coal-dust. An examination of the other pulmonary vessels of the lung reveals the same proliferation of the adventitia, and many of the smaller vessels are surrounded by nodes or rings of closely packed round cells. (Plate IV., Fig. 2.) In various other portions of the lung are areas in which the trabeculæ are thickened or the alveoli completely obliterated. Within these areas will be found nests of epithelium, and in the larger, well-defined adeno-matous structures identical in appearance with that of the largest nodule. (Plate IV., Fig. 1.)

Since the acquisition of Plimmer's method we have restained sections of this case, and find that every epithelial cell in the nodule contains a deeply stained nuclear body, which we now recognize as young para-sites. The lung trabeculæ are infiltrated with large numbers of young organisms, which can only be recognized from round cells by their form and homogeneous nature. They are either round or oval, or appear to have been hardened in the act of projecting pseudopodia. In some cases they are closely packed together, and a considerable number are found in the bloodvessels. By carefully investigating the different parts of the lung, it will be found that the epithelial infection, although present wherever nests of epithelium are formed, is not uniform, and that certain bronchi and areas of the lung have escaped. By such a comparison we may rule out the possibility of these bodies being due to a peculiarity of the staining method, and a careful comparison of a large number of sections shows that the presence of these bodies in cer-tain localities, especially in the carcinomatous nodule, holds for all the sections made, although the staining method may have been slightly modified. Directly beneath the pleural surface are areas in which the alveoli are filled with blood and the capillaries are markedly engorged. These areas correspond to the small hemorrhages observed macroscop-ically.

Examination of sections of the spleen shows it to contain a large amount of brown pigment deposited in the pulp. Evidence of wide-spread hemorrhage is also found, and the follicles are markedly enlarged. (Plate V., Fig. 1.) In sections stained with Plimmer's method the nuclei of a large number of the cells of the follicles contain a deeply stained central body—in some cases spherical, in other cases of irregular shape. These we believe are young parasites. (Plate VI., Fig. 2.)

The pigment in the pulp takes the form of triangular and irregularly shaped plates, and is very abundant. The pulp contains a large number of lymphocytes and red blood-corpuscles. Scattered between the cells in the pulp are a large number of extracellular parasitic bodies, which conform in size to the pale forms which in the fresh state are capable of sending out pseudopodia. (Plate V., Fig. 2.) (Plimmer's stain.)

Summary of Case I. : The facts in this case may be summarized as follows : The primary growth was adenocarcinoma, probably having its origin in the appendix. This had spread, involving the greater portion of the peritoneal surface, with infiltration of the omentum and mesentery. The greater portion of the tumor had undergone mucoid degeneration, and the peritoneal cavity was filled with clear, straw-colored fluid. The patient was opened aseptically. A test-tube of this fluid, which was

PLATE IV.
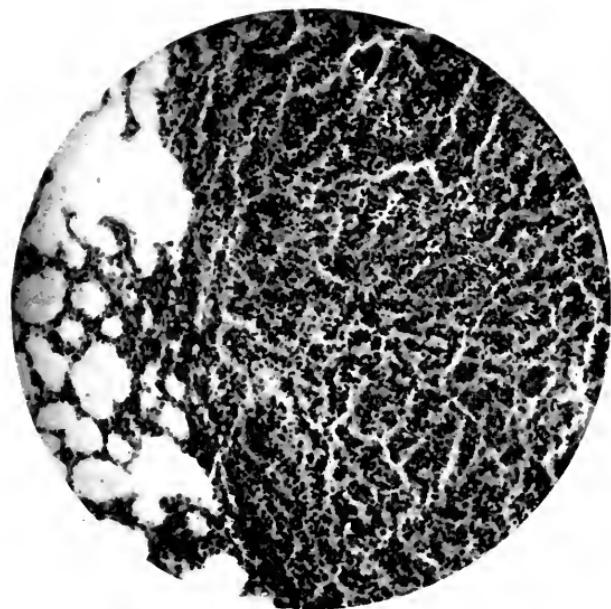
1.

Margin of smaller nodule, Pig I. (M. P.) (H. E.)
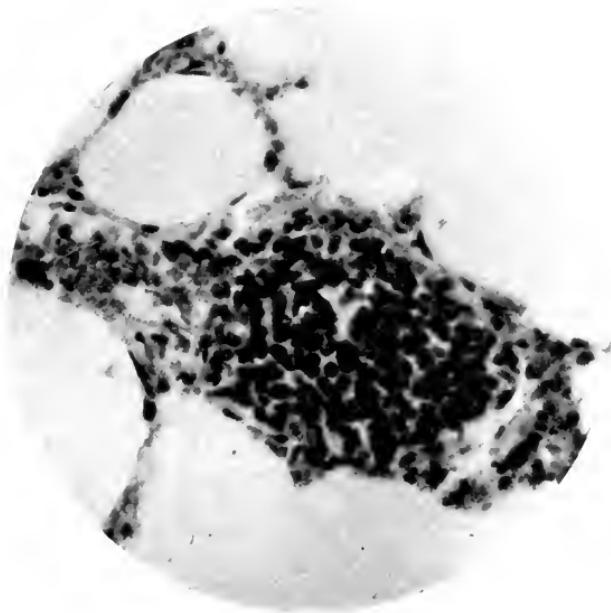
2.

Typical focus of round cells in perivascular lymph space of small vessel.
Lung Pig I. (H. P.) (H. E.)

PLATE V.
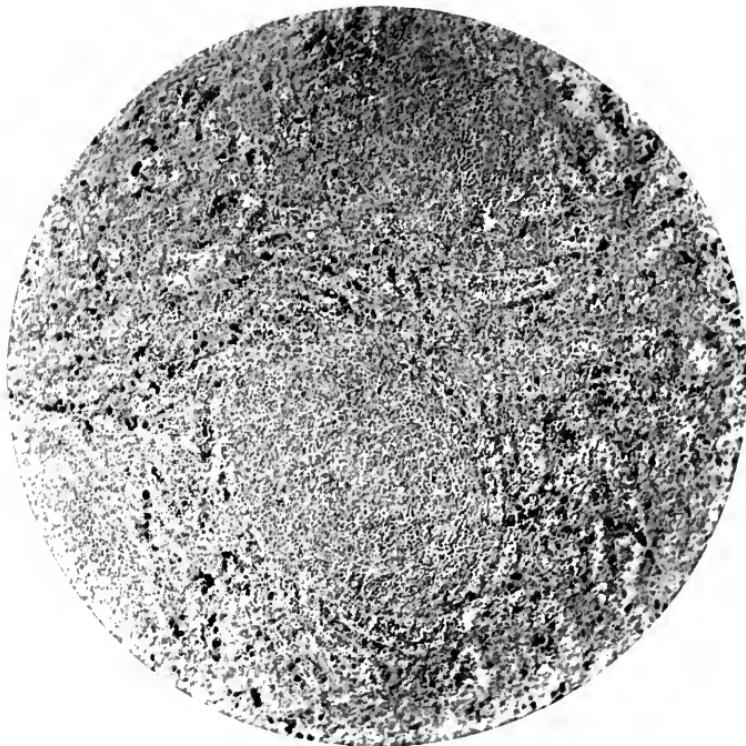
1.

Section of spleen, Pig I, showing enlarged follicles and hæmatogenous pigment deposited in pulp.   (L. P.)   (H. E.)
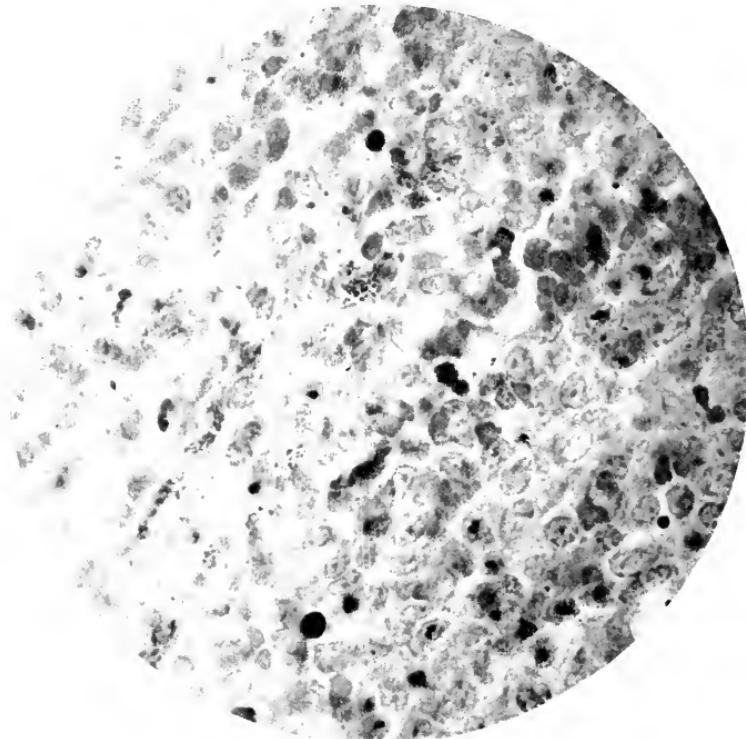
2.

Periphery of follicle of spleen, Pig I, free Russell's bodies (young protozoa) between the cells.   (H. P.)   (Plimmer's method.)

removed through a sterile tube, and which remained bacteriologically sterile after an incubation period of thirteen days, contained a large number of small hyaline bodies, which were observed under the microscope to increase in size and change their form and pass through a cycle of development to what appeared to be a spore-forming stage, was injected into three animals—two, a dog and a guinea-pig, in the peritoneal cavity ; one, a guinea-pig, in the jugular.   The guinea-pig and dog which were inoculated in the peritoneal cavity developed no tumor formation, but a marked peritonitis and enlargement of the regional lymph nodes.   The abdominal cavities of each animal contained a small amount of fluid ; and in this fluid we were able to detect the characteristic spherical bodies, nucleated bodies, and sacs filled with the granules already described as being present in the primary case.

Slides taken from this fluid and incubated for a period of three or four days in the thermostat showed that the bodies not only changed their form, but we were able to trace the development of the larger structures from the small hyaline forms.   Of particular interest was a portion of a slide so treated, in which we found numbers of the organisms which had sent out pseudopodia toward a neighboring air-bell. There were at least twenty organisms so arranged, and all of them had run out long pseudopodial projections to the margin of the air-bubble.

The animal injected in the jugular was killed after fifty days. On section the lungs were found to contain minute white nodules, which, on microscopical examination, proved to be beginning foci of adenocarcinoma.   The pulmonary bloodvessels showed marked proliferation of the epithelial and adventitial cells.   The spleen of the animal contained a large amount of blood-pigment, and the Malpighian corpuscles were enlarged.   The cells of the tumor and those of the enlarged follicles in the spleen were each found to contain within the nucleus irregularly-shaped, deeply-stained bodies of unusual appearance.   About the periphery of the follicles and scattered through the splenic pulp were a number of round and oval bodies, which corresponded morphologically to what are known as Russell's fuchsin bodies. In the perivascular lymph spaces of the lung we have since been able to detect, by employing Plimmer's staining method, the presence of the half-grown organisms in large numbers, which corresponded to those described by him as of constant occurrence in carcinoma in man.

Our attempts to cultivate these organisms at the time of this experiment were not followed by success, as the forms of culture media employed were unsuitable.   As will be seen later, in the experiments which shortly followed upon the one just described we met with better success, and succeeded in cultivating with comparative regularity, directly from cancer, from fluids which were in contact with cancer, and from experimental animals, the organisms which have been

described in this first experiment. The medium which has thus far given us the best results is that recommended by Celli for the cultivation of amœbæ, fucus crispus bouillon.

Two other animals were inoculated at this time—one, a guinea-pig, in the peritoneal cavity, which was killed after nineteen days, and a dog which rapidly became emaciated and died after sixty-four days, presenting marked evidence of peritonitis with general enlargement of the regional lymph nodes, enlargement of the spleen, and œdema of the lungs. In the peritoneal fluid and the heart's blood, as well as from the organs of these animals, we were able to detect large numbers of the parasites. Sections of these organs, which have since been stained with Plimmer's method, reveal the presence of large numbers of the parasites in all of the viscera, however, especially numerous in the lymph nodes and lungs.

A number of tubes of the serum from this first case have been retained in the laboratory, and animals have been inoculated with them at later periods. Of special interest are Guinea-pigs 40, 42, and 43, which were inoculated with this serum which had stood for four months, with no other precautions being taken than placing the tubes which contained it in a cool place. The animals inoculated at this later period gave identically the same results as those of the original experiments.

During the period of these first experiments I was fortunate in having as an assistant Dr. F. C. Busch, who now occupies the chair of physiology in the University of Buffalo. Dr. Busch was of the greatest service to me, and assisted me in all of the work of that period with great skill and devotion.

Following these first experiments our efforts were especially directed toward an investigation of the fresh scrapings of cancers, and in attempting to demonstrate these bodies in the tissue in hardened sections. Having once established the fact that the small spherical bodies which so closely resemble fat were not fat (giving no reaction with osmic acid[1] and not being affected by fat solvents) we set about to determine how the great discrepancy between the large number of parasites found in fresh cancer and in sections could be accounted for.

A careful examination of a large number of tumors, including those removed by operation, shows that in all rapidly growing tumors, espe-

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[1] In determining the relation of these bodies to osmic acid, fat was used as a control and placed under the same conditions. In one or two cases, after a treatment of one or two days with osmic acid, the writer has observed a slight browning of the periphery of these bodies, but fat used as a control had long before given the intense black reaction which characterizes it. We are not certain whether or not it is possible to cause a browning or possibly even blackening of these bodies by osmic acid if treated in some special manner. This question will be the subject of a special piece of research in the laboratory, but will in no way affect the significance of our findings. Sections hardened in Hermann's fluid in which the fat in the tissue gives the usual black reaction when cleared in origanum oil and covered with a cover-glass without staining show bodies that are of a yellowish color.

cially when of large size, a great number of organisms are present. Small tumors, as a rule, were found to contain only the smaller forms of the organisms; the tumors and organs removed from cadavers of patients who had died from carcinoma or sarcoma showed the presence, especially in the tumors, of great numbers of the organisms in all phases of development. After comparing tumors removed by operation and those from cadavers it becomes evident that the organisms either increase very rapidly during the period just before death or that they proliferate in the tissues after death. In two cases of large-sized tumors, which immediately after operation contained a predominating number of the small forms of the organism, and which were retained sterile, we were able to make the following observations:

An examination of successive scrapings from the tumor, several hours apart, in each case showed that the relative size of the organisms gradually increased. In the course of ten hours repeated scrapings showed that the amœboid forms were greatly increased in number, and after twenty-four hours the spore sacs of the organism were present, for the first time, in large numbers. Continuing our observation up to a period of about three days, we observed in these two cases that the sacs were ultimately replaced by groups of hyaline bodies, which were considerably larger than those which the sacs originally contained. It will be seen from this observation that the so-called fatty degeneration of carcinoma is at least in some part due to the presence of the various forms of the organism which have been mistaken for fat droplets and infected epithelial cells which were supposed to be in an advanced stage of fatty degeneration.

We were likewise able to determine that in the centre of carcinomata which had undergone degeneration the fluid, the so-called cancer milk of the older writers, consists practically of a pure culture of these organisms. The fluid from malignant ovarian cysts likewise contains a large number of the organisms, and the peculiarly characteristic mush found in the cavities of certain adenocarcinomata of the ovaries is likewise largely composed of the various forms of the parasite.

We were thus forced to conclude that bodies identical in appearance to those observed by us in the peritoneal fluid of our first case could be found in all scrapings of cancer. The small, highly refractive form which in suspension possesses a characteristic oscillating motion, the larger pale forms projecting pseudopodia, and the saccular forms containing highly refractive spherical bodies could be detected with equal facility in the fresh scrapings of any malignant tumor. The small form of the organism which so closely resembles fat, and the larger spherical forms containing fine granules are particularly abundant. By incubating hanging-drop preparations of fresh scrapings from cancer the smaller forms can be followed in their development, during which

they grow in size and finally become granulated, and, if kept upon a warm stage, ultimately throw out pseudopodia, develop a nucleus, and end by turning into a sac containing the spores of the organism. Owing to the fact that the specific gravity of the organism is less than water, it rises to the surface, and must be sought directly beneath the cover-slip and not in the lower portions of the fluid. This fact we had noticed and made use of before the recent publication of Funk on the vaccine organism.

Having ascertained that a large number of organisms were invariably present in cancer, we undertook to determine why these organisms could not be demonstrated with the ordinary staining methods in the tissues, and were able, first of all, to determine that the application of almost all fixatives caused the disappearance of all the spore sacs of the organisms, and the greater part of the large spherical and granular bodies. Only the small, more resistant forms of the organism remained, and these we were able to stain in a large number of sections with the aniline dyes, in which case they presented the form which has already been recognized and first described by Russell, known as "Russell's fuchsin bodies." The larger forms which are still hyaline in character or contain fine granules, and which might be spoken of as the quarter-grown organism, in sections stained by the ordinary methods so closely resembled free nuclei and round cells that it was impossible to state which were parasites and which tissue elements. In one case, however, of carcinoma of the bladder, observed during this period, where the organism appeared in large numbers in the urine, we were able to detect, even in hæmatoxylin preparations, the quarter-grown form of the parasite between the epithelial cells, and attached to the surface of the tumor after removal.

In the summer of 1898 the writer was asked to make an autopsy on a female patient who had died of carcinoma of the uterus. On opening the peritoneal cavity we were surprised to find an advanced general peritonitis. There was considerable clear fluid in the peritoneal cavity, and the surface of the peritoneum had lost its brilliancy. The intestines were matted together, and the thought was immediately awakened that a perforation of the vagina had probably occurred as the cancer involved the cervix, and that bacteria had entered the peritoneal cavity and had thus produced a secondary infection. On examining the spleen it was found that nearly one-half of that organ was in a condition of infarction; and on examining the lungs they were found to be markedly œdematous. Cultures for bacteria were made from the peritoneal cavity, the spleen, the blood, and the lungs, with the result which was determined later that they all remained bacteriologically sterile.

On returning to an investigation of the pelvic organs, we were immediately struck with the fact that there was no perforation, which at once directed our attention to the possibility that the case might be one

of general infection with the organism of cancer. For this reason we immediately made fresh preparations from the surface of the peritoneum, the substance of the spleen, the lungs, the heart's blood, and one of the larger superficial veins of the lower extremity. In all of these were found large numbers of the pale hyaline forms which we had already learned to recognize as constant in scrapings from carcinoma, in the peritoneal fluid of carcinomatous patients, and in the heart's blood and peritoneal fluid of our experimental animals. Dr. Irving Phillips Lyon, associated with the laboratory, was present with me at the autopsy, and confirmed my observations.

This was the status of our work in December, 1898, and it was upon the basis of these facts that the writer made the statement before the Medical Society of the State of New York, in January, 1899, which was quoted at the beginning of this paper. It will be seen from this statement that we believed we had recognized and demonstrated the presence of parasites in cancer and had successfully produced cancer in one animal, but that we were not at that time in a position to state what the nature of these parasites might be.

During the winter of 1898–99 the writer planned an elaborate series of experiments, based upon our original experiment, which are only just completed. With the clew afforded by the findings of the autopsy described above we have examined since that time the organs of a number of cadavers which have died from cancer, and on the bases of these observations we are prepared to state that *all the organs, including the blood taken from all regions of all cases dying of cancer, including sarcoma and epithelioma, contain large numbers of the organisms.*

Following the same lines, we have likewise observed *in all cases of carcinoma and sarcoma thus far examined in which cachexia was well marked, that the organisms, especially the younger forms, can be detected in the peripheral blood.* In these cases the smaller forms of the organism possess the peculiar oscillating motion already described. The quarter-grown forms of the organism are usually actively sending out pseudopodia, and conform very closely in appearance to the amœboid bodies found in the blood by Pfeiffer and Reed after vaccination and in cases of smallpox. (The question of the time of appearance of these organisms and the utilization of this fact as a means of diagnosis already forms the subject of a piece of research in the laboratory.) Animals may be infected by inoculating them with the peripheral blood from cachectic cancer cases when the serum contains the organism. In these cases the organism possesses great virulence. The younger forms of the organism may likewise be found in the peripheral blood of the animals after inoculation with cultures or carcinomatous material. Figs. 2 and 3, Plate VI., represent the larger hyaline forms of the organism from the blood of a case of fatal malignant lymphoma obtained seven days before death.

Having reported before the State Society our findings of parasites in cancer, it remained for us to determine the nature of these organisms and to continue our investigation in the most comprehensive manner possible. It became at once apparent that there could be but two possibilities in the case—either that the organisms were of an animal nature, and were then protozoa, or that they belonged in the vegetable kingdom, in which case they were in all probability low forms of fungi, probably yeasts. In order to understand the difficulties which prevented our arriving at an earlier conclusion as to the nature of these parasites it is well to review the status of scientific research at that time.

When, in 1898, the State of New York established a laboratory for the investigation of cancer, the attention of the scientific world was attracted by a series of five articles published by an Italian investigator, Sanfelice, of Cagliari, Sardinia, all of which appeared in the *Zeitschrift für Hygiene und Infectionskrankheiten*. Beside these, a number of articles appeared in different periodicals by a second Italian investigator, Roncali. These last are of less importance. The purport of the articles of both of these investigators was that the parasitic inclusions found in cancer were identical in appearance with yeast organisms or blastomycetes when injected into the tissues of animals. Sanfelice's articles went further, and in the twenty-ninth volume, 1898, of the above-mentioned journal, he published an account of tumors which he succeeded in producing by inoculation with a yeast in two dogs, both of which he wishes to designate as true adenocarcinoma forming metastases.

Before entering into a discussion of the merits of Sanfelice's investigations it is well to state that the first observer to interpret the spherical, hyaline bodies found in cancer as blastomycetes was Russell. Russell published an article in the *British Medical Journal*,[1] in 1890, in which he claimed that he had detected a micro-organism to which he gave the non-committal name of " fuchsin body." These were found in groups or clusters of from two or three to twenty or more. They were from four to twelve μ in diameter, were apparently homogeneous, and in some cases the groups of bodies were held together by a faintly stained material. He believed they belonged in the yeast group (Sprosspilze). Russell made no attempts to cultivate these organisms. His publication

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LEGEND OF PLATE VI.

Fig. 1. Centre of follicle of spleen, Pig 1. A large number of cells contain deeply stained bodies within the nuclei (internuclear infection).

Figs. 2 and 3. Young forms of parasite from blood of case of malignant lymphoma. (Oil immersion, fresh preparation.)

Fig. 4. Very small and quarter-grown form of parasite from case of carcinoma of pylorus involving omentum. Culture obtained from fragment of metastatic deposit on fucus crispus bouillon. (Oil immersion, fresh preparation.)

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[1] An address on a Characteristic Organism of Cancer, December 13, 1890, vol. ii., p. 1356.

PLATE VI.
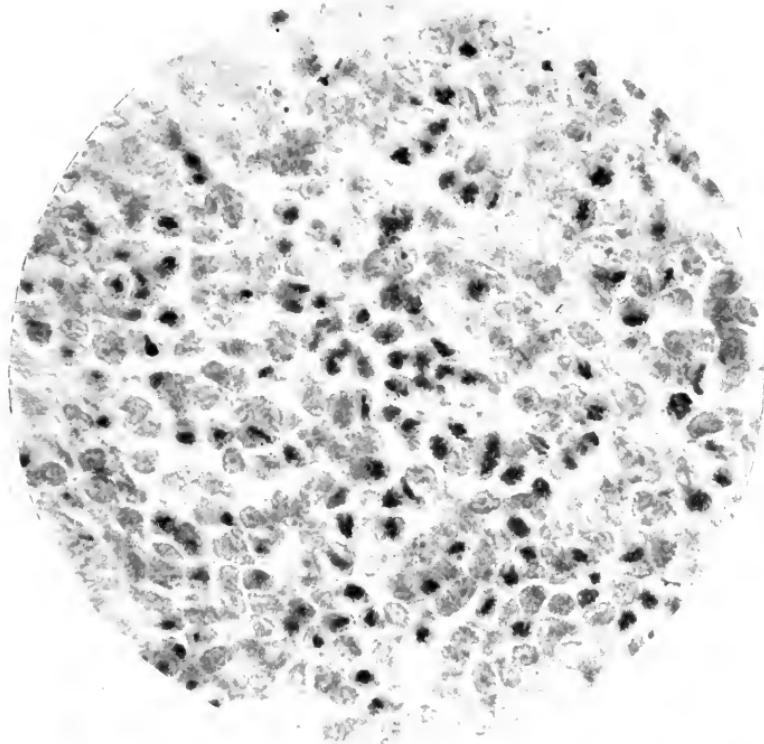
1.
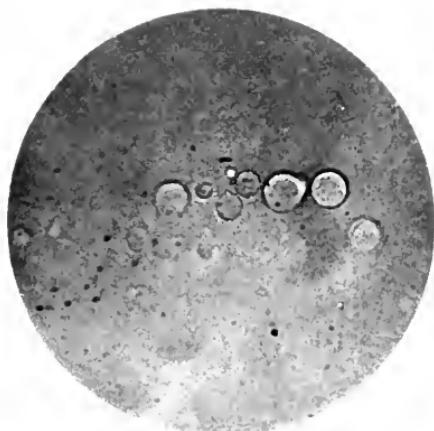
2.

3
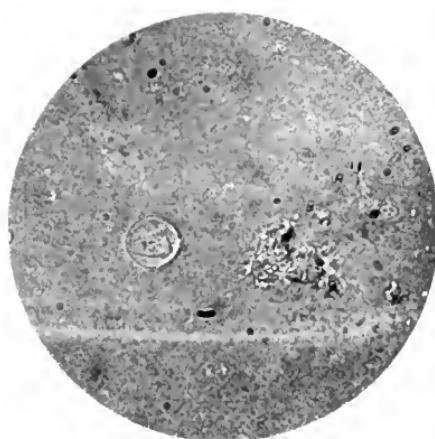
led to very heated discussion, and his work was attacked, especially by
Shattuck and Ballance, *British Medical Journal*, 1890, vol. i., p. 565,
and Klein, *Beiträge zur pathologischen Anatomie und zur allgemeinen
Pathologie*, 1891, Bd. xi.   The first of these authors described similar
bodies found in caseating lymph nodes and the walls of senile arteries,
while Klein was of the opinion that Russell's bodies bore a close relation
to Altmann's cell granulæ.

    In 1895 Busse, a German investigator, published the first description
of an undoubted yeast, which he found to be the cause of a fatal infection
in man.   This organism he succeeded in isolating in pure culture,
and found that the lesions which it produced were a combination of
abscess and tumor formation (" Ueber Saccharomycosis Hominis,"
Virchow's Archiv, vol. cxl., p. 23).   The appearance of the organisms in
the tissue was so suggestive of the cell inclusions in carcinoma that
Busse had previously published a description of the case under the
title " On Parasitic Cell Inclusions and their Cultivation," in the *Cen-
tralblatt für Bacteriologie*, vol. xvi.   The organisms were very com-
monly within the large cells which composed the walls of the abscess
cavities, and under these conditions presented an appearance very much
like the cell inclusions of carcinoma.   In 1897 Busse published a mono-
graph entitled *The Yeast Organism as the Cause of Disease*.   In his
last publication he is distinctly of the opinion that the pathogenic
yeasts and the cell inclusions in cancer have no relation to each other.
He describes a series of experiments which he carried out in the hope
of causing proliferation of the cell inclusions of cancer.   For this pur-
pose he planted small portions of tumor in which he had detected the
inclusions in various kinds of culture media, and placed them for
several days in a thermostat.   In none of these experiments was he able
either to obtain a culture of organisms or to observe that the cell inclu-
sion showed any evidence of increase in number or change of form.   He
likewise attempted to inoculate animals with small portions of lympho-
sarcoma, with negative results.   He included a short description of all
of the organisms of the same class described up to the time of his pub-
lication, and because of the negative results obtained and the fact
that no positive evidence had been produced to show the identity of
cell inclusions and yeast organisms, he concluded that they had nothing
to do with each other, and that the yeast organism played no rôle in the
production of carcinoma.   Beside Busse, a number of observers have
since described lesions of various kinds (especially skin lesions) produced
by yeasts.[1]

    The articles of Sanfelice are of the greatest interest, as he has under-
taken to elucidate the subject by a careful study of wild yeasts and

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such as he found to possess pathogenic properties for animals. Among these was one obtained by cultivation from the skin of a lemon, which, when injected into animals, produced granulomata. These, in his opinion, closely resembled sarcoma, for which reason he gave the organism the name "saccharomyces neoformans." In 1898 Sanfelice published an account in which he stated that in his experiments he had inoculated, up to 1896, fifty-nine dogs. His method of inoculation he had varied as much as possible—some in the subcutaneous connective tissue, others in the testes, others in the breast, the spleen, the liver, the lungs, the jugular vein, and the peritoneum. Most of the animals showed no pathological change and were killed after three, four, and five months. In the greater number of these animals Sanfelice was unable to cultivate the organisms from the region of the inoculation, but in most cases he was able to secure them from the regional lymph nodes. By transferring his organism from dog to dog he succeeded in increasing its virulence to such an extent that, while in the beginning when injected into the jugular vein it produced no lesions, in the end similar inoculations resulted in the death of the animal, with the development of characteristic changes in various organs. Beside simple inoculations, he practised various methods to reduce the resistance of the animals, such as drawing a portion of their blood, injuring the tissues before inoculation, and introducing foreign bodies at the time of the inoculation. None of these devices produced any further results than those obtained by the simple inoculation. He ultimately succeeded in obtaining what he described as a positive result by inoculating a female dog with a culture of saccharomyces neoformans which had passed through a large number of dogs. A small portion of the culture was removed with a platinum needle, emulsified with sterile water, and injected into the breast with an ordinary sterile syringe. After the first few days the breast showed a certain amount of swelling and inflammatory reaction. *This disappeared after a few days and the breast presented a normal appearance.* After several months he observed that the breast in the neighborhood of the inoculation began to swell, and this increased gradually until a definite tumor was formed, which at the time of the death of the dog, ten months later, was about half the size of an egg. With the development of the tumor the dog showed definite signs of emaciation. The tumor was of greater consistence than the breast, and the nipple was retracted. The skin in one or two places was apparently adherent to the tumor. The inguinal lymph nodes on both sides were somewhat enlarged, the largest about the size of an almond, the smallest the size of a hazel-nut. The organs of the thorax and head showed no pathological changes.

Microscopical sections made through the tumor showed that the centre of the structure did not possess the same histological character-

istics as the periphery. At the centre the tumor presented the appearance of the normal breast of the dog. At the periphery the histological characteristics of the tumor were such, to judge from the description of the author, as to strongly suggest malignant change. Instead of the single layer of epithelium lining the spaces in the connective tissue stroma, which characterized the centre of the tumor, the portions near the periphery were lined by multiple layers of large epithelial cells. The nuclei were irregularly arranged, of varying size and form, and the membrana propria of the canals was missing. Isolated nests of epithelium were likewise to be found in the stroma. The epithelium exceeded in amount the connective tissue stroma. Sanfelice found that the enlarged lymph nodes on section presented the appearance of containing metastatic deposits of the large tumor. Sections cut from these lymph nodes showed that they actually contained epithelial structures of similar form and appearance to the peripheral portions of the tumor.

From the description of the tumor given, indicating the development of metastases in the regional lymph nodes, if the description of the author can be taken, there is little reason to suppose that the case was not one of true adenocarcinoma. *From the original tumor and all of the lymph nodes, Sanfelice was unable to obtain cultures of his organism, and neither in the metastatic deposits nor in the primary tumor was he able to demonstrate bodies which were unquestionably yeasts.*

Beside the case just mentioned, Sanfelice describes a second dog, which was inoculated in the testicles, and which, after a period of four months, had developed a well-defined enlargement of the organ and several nodular masses, which appeared to be enlarged regional nodes. Several nodular masses were found within the prepuce of the animal, and Sanfelice observed that from the orifice a small amount of purulent fluid could be expressed, in the cells of which he detected inclusions closely resembling the bodies of Russell, which he considered to be altered yeasts.

The animal died unexpectedly during the sixth month, and at the autopsy, which was performed with the assistance of Prof. Charbone (pathologist), the nodular enlargement of the testicle was found to be of yellowish-white appearance, of definite consistence, which could not be sharply differentiated from the tissue of the testicle. On both sides of the penis bone were a large number of apparently metastatic deposits —one of these as large as a hazel-nut, the majority about the size of peas. Surrounding the glands was a conical mass of newly-formed tissue, which communicated with the preputial opening. The primary tumor appeared to be in the testicle, and the smaller deposits appeared to be of a metastatic nature. The inguinal lymph nodes were slightly enlarged, and on section presented a normal appearance. The spleen,

kidneys, and liver were slightly hyperæmic, but showed no other changes.

As the autopsy revealed no well-defined cause for the exodus, the decision was reached that the animal had been surreptitiously poisoned. Cultures which were made by emulsifying portions of the tumor and metastases were all negative. Portions of the tumor were used to inoculate other animals. At the time of the publication Sanfelice was not in a position to state the outcome of these experiments. Sections of the tumor showed it to be very probably of epithelial nature. The cells of the tumor were rather small, and closely resembled those of the basal cells of the seminal vesicles of the dog.

In 1898 the writer had the pleasure of making Prof. Sanfelice's acquaintance and carefully going over with him the sections from these two cases and obtaining from him a culture of the saccharomyces neoformans and blocks of tissue from the two tumors. It is important in estimating the work of an observer to know something of his character and temperament, and for that reason it was a great pleasure to make Prof. Sanfelice's acquaintance. He is a man of unquestionable sincerity and honor, and no matter what the interpretation of the work which he has published may be, his statements can be accepted as accurate so far as observation can make them. There is absolutely no question that the tumor of the breast with metastases in the regional lymph nodes, described by Sanfelice, would pass muster as an adenocarcinoma.[1]

The courtesy which Prof. Sanfelice showed me in placing before me and at my disposal all of his material has been of the greatest service to the laboratory, and I wish to take this occasion to publicly thank him for his courtesies. The culture which he forwarded to us was that of an ordinary yeast, so far as we are able to classify it. The appearance of the culture and of the fresh organism is shown in Plate VII., Figs. 1 and 2.

The publications of Roncali have been confined to the description of attempts to cultivate yeasts from carcinomata. He describes several successful attempts in which he employed acid sugar-water as the medium. The writer was not deeply impressed with the preparations which Prof. Roncali showed him, and, as his cultivation experiments are so widely at variance with those of other observers and ourselves, we feel that they do not require a detailed description.

In the April number of the *Practitioner* for 1899 there appeared an article by Plimmer which is without doubt the most important communication in a number of that journal devoted entirely to the subject of cancer. After a short review of the literature, and an analytical discussion

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[1] The probable significance of these experiments will be considered in Part II. of this article.

PLATE VII.

1.

Potato cultures of Plimmer's yeast
and Sanfelice's "Saccharomyces
Neoformans."

2.

Fresh preparation of " Saccharomyces Neoformans,"
Sanfelice. (Oil immersion.)

3.

Fresh preparation of Plimmer's yeast. (Oil immersion.)

of the structure of cancer, Plimmer gives the method by which he has examined a large number of cancers of various types. He recommends various hardening and staining methods for the demonstration of cellular inclusions, and, as in our experience one of these methods gives pre-eminent results, it would seem desirable to introduce it at this point:

1. Small slices of tissue are hardened in Hermann's fluid twelve to twenty-four hours.

2. Thorough washing in running water, twelve to twenty-four hours.

3. Harden in alcohol; embed in paraffin.

4. Remove paraffin in xylol.

5. Absolute alcohol.

6. Place in peroxide of hydrogen until the black is removed from the section and no further bubbles form upon the surface, one-quarter to half an hour.

7. Wash in water.

8. Stain with Haidenhain's iron hæmatoxylin or Mallory's simple iron hæmatoxylin.

9. Thorough washing in running water three to six hours.

10. Stain in 1 per cent. Ehrlich's neutral red or Bordeaux red. (This solution must be kept neutral. When it becomes acid it must be neutralized with alkali.) After staining with iron hæmatoxylin the differentiation must be continued until the protoplasm is colorless. The amount of red in the preparation must be controlled under the microscope.

Parasitic bodies in cancer and yeast organisms in the tissue are stained yellowish-red to coppery-red; nuclei, blue-black; connective tissue structures, brilliant red. Plimmer's description of the bodies is as follows:

" The parasites, as they most often occur, are round bodies of very diverse sizes, from 0.004 mm. to 0.04 mm. or even more in diameter. There is a central portion which I shall call here for convenience the nucleus, although there is nothing in this central portion in common with the biological nucleus, which is generally round, but which may be irregular in shape; around the nucleus is a layer of protoplasm, and outside of this is a capsule. This nucleus differs in its microchemical reactions from the nucleus of the cell; it takes, with the Ehrlich-Biondi solution, a copper-red color; with thionin, a dark purple; and with (1) of the double hæmatoxylin stains, described on page 440, it also takes a copper-red color, quite different from the red of either the protoplasm or the fibrous stroma; and with (2) it takes a dark claret color, again darker than that of the protoplasm or stroma. With the Ehrlich-Biondi stain it reacts somewhat like the nucleolus of the cancer-cell nucleus, but the color of the latter is much brighter; moreover, with many other stains—such as aniline-blue or *bleu de Lyon*, aniline-

green—it does not, as does the nucleolus, lose the stain when washed with spirit, but retains it even after immersion.   This is to be remembered against the assertion that these bodies are aberrant nuclear structures.   In very perfectly fixed specimens a lighter spot can be observed in the nucleus, which is not visible in fresh specimens; but in fresh specimens the nucleus appears to be larger than in fixed ones.   It is to be noted that the nucleus is practically refractory to hæmatoxylin used in the strongest manner possible, when this is done by the ordinary methods.   This, again, is very important in connection with the statement that the bodies are nuclear structures.

" The layer of protoplasm around the nucleus is generally homogeneous, and stains much less deeply than the nucleus.   With alcohol fixation, again, the phenomenon of metachromatism is sometimes seen, the protoplasm staining blue with the Ehrlich-Biondi mixture.   When the parasite has attained a certain size a rayed appearance is often seen in the protoplasm, but I have never seen this in the fresh state, and think it may be due to the fixative.

" The capsule is a very well-marked structure, which can be seen well both in the fresh as well as in fixed specimens.   That this capsule is a part of the parasite can be demonstrated by the fact that it can sometimes be seen folded over on itself, and sometimes from fixation it shrinks away from the protoplasm of the cell, and also the parasite can sometimes be seen free in an alveolus with its capsule around it.   It stains more definitely than either the nucleus or protoplasm; with the Ehrlich-Biondi mixture it is a brighter red than either of the other structures; with thionin it is darker; with hæmatoxylin, acid fuchsin, and orange it is a clear, bright red, and with hæmatoxylin and Bordeaux red it shows best as a very bright red line.

" This description applies to the forms most commonly met with, but there are some other forms which are met with, especially in cancers of rapid growth; they are, however, rare, so I will merely tabulate them :

" 1. The form described above, in which the nucleus has attached to it a small body with similar reactions—*i. e.*, reproduction by budding.

" 2. A very small form, consisting of a capsule with a small central dot, staining similarly to the nucleus of the larger forms.

" 3. A larger form, consisting of a capsule in which are two large dots in one diameter, and two smaller dots in another diameter at right angles to the first.

" 4. A larger form again, consisting of a fine capsule, in which are a number of fine dots, not arranged systematically.

" 5. A still larger form, consisting of a well-marked capsule, in which is a central nucleus with generally six smaller dots arranged around it."

Plimmer states that during a period of six years he has examined microscopically 1278 cancers.   These did not include any cases of sar-

PLATE VIII.
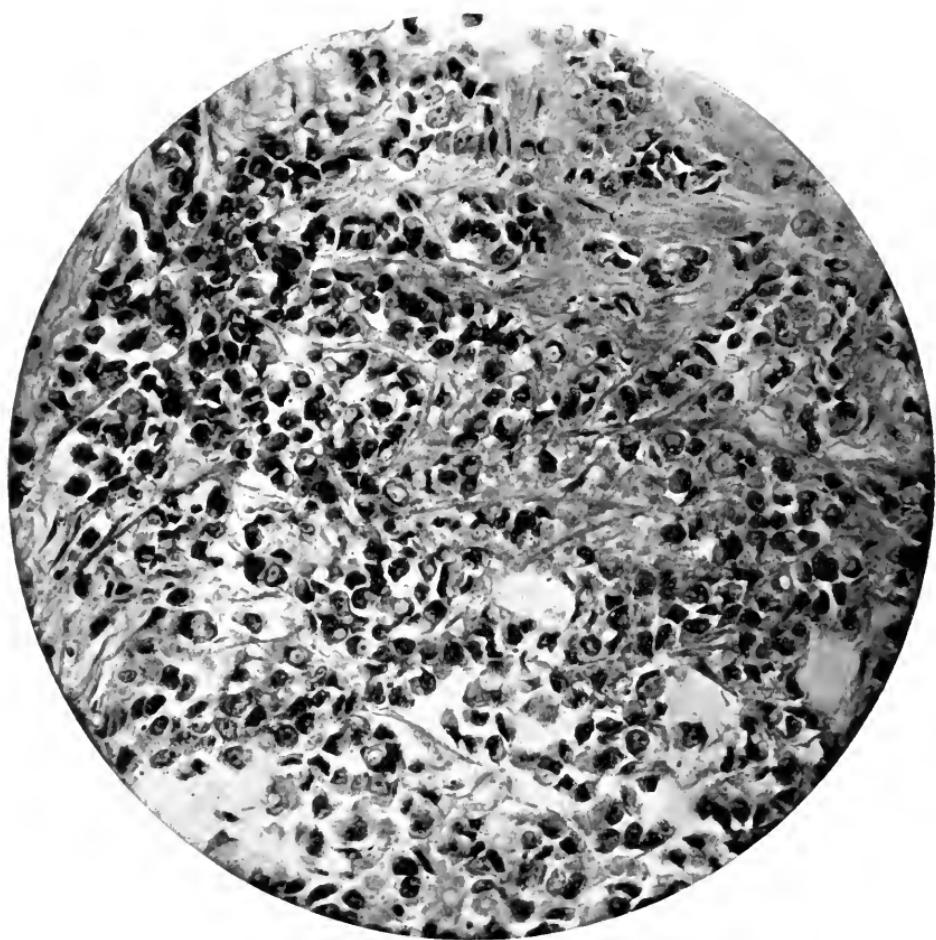
Section of rapidly growing carcinoma of breast. (Original preparation from Plimmer stained with Plimmer's method.) Nearly every cell contains a Plimmer body (inter-cellular protozoa). (Low Power.)

coma.   In 1130 of these cases he found parasitic bodies which come under the heading of those just described by him.   His list included cancer of the breast, skin, including tongue and penis, uterus and vagina, stomach and intestines, liver, pancreas, lung, bladder, and glands.   The parasites were not found in all portions of the cancer, but were usually present at the growing edge, and in the degenerated portions of the growths they were absent.   They appear only in the bodies of active cells, and not in those which show retrograde or degenerative changes.   They may be found free lying between the cells and having the same reactions as those which are included within the cell protoplasm.   They may also be found in leucocytes.   They did not appear in anything like equal numbers in all cases.   Generally speaking, in most cancers they were comparatively few in number, but in some very rapidly growing cancers they could be found in enormous numbers, as in the case which he illustrates.   He states that in his entire list he has only nine in which there were a large number of parasites ; but in these cases there was scarcely a cell which did not contain one or more or even as many as sixty parasites.   He states that he has likewise examined a large number of other pathological conditions with a view of determining whether similar bodies could be found.   These structures included gummata, histoid tumors of all kinds, tubercular growths, glanders, actinomycotic growths and tissues which had been irritated, as well as normal tissues, and concludes by stating :   '' I have never in man, in any instance, seen any intracellular or extracellular bodies which were like the parasitic bodies described above, or which had their reactions.''

The sixth portion of Plimmer's article is devoted to a description of attempts to cultivate the parasitic inclusions which he describes, and states that in the last case which he has investigated, and which contains a large number of parasitic bodies, he was able to isolate the organism which, in certain animals, was capable of causing death by the production of tumors in various parts.   The primary growth was a carcinoma of the breast taken from a woman, aged thirty-five years. It had a history of only two months' duration, and was growing rapidly at the time of operation.   Prof. Plimmer has been kind enough to present me a section from this case, a photograph of which is shown on Plate VIII.   In cultivating the organism he employed a medium, the basis of which was an infusion of cancer prepared according to the formula employed for ordinary bouillon, and to this was added, after careful neutralization, 2 per cent. of glucose and 1 per cent. of tartaric acid.   Into this were introduced small pieces of the growth, cut with all possible precaution against contamination, and the inoculated tubes were placed under anaërobic conditions.   After three to five days in three of the flasks inoculated he found a culture of an

organism which undoubtedly belongs in the yeast group. We are again indebted to Prof. Plimmer for a culture of this organism. When grown upon ordinary culture media it is that of an ordinary yeast (see Plate VII., Fig. 1). Its histological characteristics are shown in Plate VII., Fig. 3.

I wish to thank Prof. Plimmer for the courtesy which he has constantly shown our institution, both by communicating to us the result of his more recent work and by supplying us with sections and cultures.

Beside Plimmer, several observers claim to have been successful in the cultivation of yeast organisms from cancer. Kahane obtained a culture of blastomycetes from a cancer of the uterus; Mafucci and Sirleo have obtained cultures from malignant tumors, but their results were mostly negative; Corselli and Frisco report a case of sarcoma of the mesenteric glands, from which they isolated a blastomyces. They obtained the organism during the life of the patient, and after death from the fluid in the abdominal and thoracic cavities. This is apparently a case of true yeast infection. Curtis has reported a case of myxomatous tumor in man, from which he obtained a culture of a blastomyces, which after inoculation produced a similar tumor in a rabbit. Sawtschenko, who published an article in the *Bibliotheca Medica*, 1895, on "Sporozoa in Tumors," states that on a further consideration of his specimens he is now inclined to believe that they are altered yeast organisms. Anna Steckson, in an article on "The Blastomyces of Curtis and its Relation to the Etiology of Tumors," Stockholm, 1900, states that she has cultivated blastomycetes from five cases of carcinoma. The organisms grew on all the ordinary forms of culture media.

In reviewing Plimmer's work the following points present themselves:

1. Can the bodies differentiated by Plimmer's methods and found by him in a large number of cancers be demonstrated in all cases of carcinoma?

2. Is their morphology constant and do they present characteristics by which they can be invariably recognized?

3. Can they be explained as changes in the protoplasm due to degeneration or other causes?

4. Are there morphological and biological grounds for believing that they are altered blastomycetes?

5. Do they bear any relation to the parasites described by other authors—*i. e.*, Russell's bodies and the various cell inclusions interpreted as protozoa?

To determine whether Plimmer's bodies are constant in all malignant tumors a systematic investigation was undertaken immediately after the publication of Plimmer's article. The writer obtained from Prof.

PLATE IX.
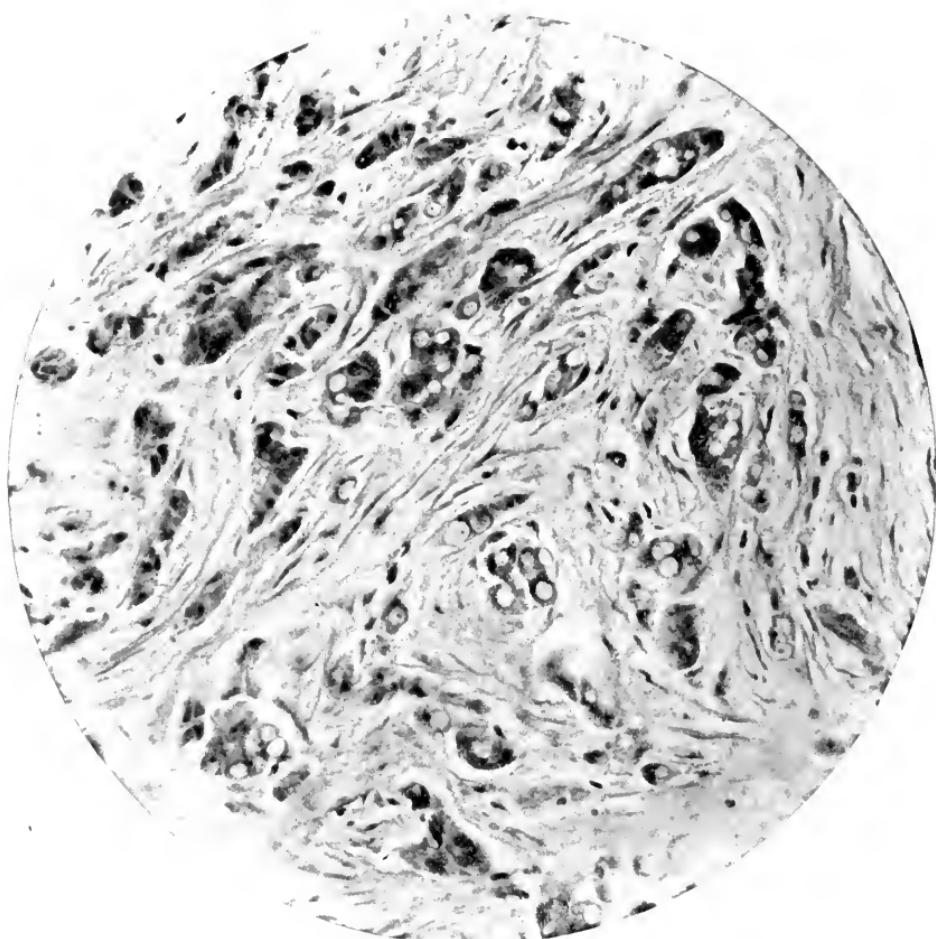
Section of rapidly growing carcinoma of breast. (Case 113, Buffalo.) The magnification is the same as Plate VIII. Nearly every cell contains a parasite. Many cells contain more than one.

Plimmer sections from the case he had published, in which the organisms were stained, which were used for comparison, and a detailed account of his staining method was obtained in person. It will be noted in referring to Prof. Plimmer's article that he failed to mention in the description of his method for the demonstration of the bodies the peroxide treatment of the sections which is step six of the method.   This is an extremely important point, and may have led to negative results with those who have adhered strictly to the method as published in the *Practitioner.*   We do not know how Plimmer came to overlook this step in his publication, or how important he regarded it, but in our experience it seems to be distinctly fundamental, as the tissues do not take either the iron hæmatoxylin or the red satisfactorily when it is omitted.

During the past two years a large number of tumors, both malignant and non-malignant, as well as tissues not related to tumors, have been hardened and stained according to Plimmer's methods, and a large number of sections from each case have been carefully scrutinized. *The results of our observations completely substantiate Plimmer's claim that these bodies are present in all carcinomata.*

In tabulating the results we have used the terms " present " and " absent," and under " present " have classified the number of bodies encountered as " few " and " occasional."   Under " few " is meant only one or two organisms to a section, or less than one organism to a section.   " Occasional " means eight or ten or more to a section.   The results of our investigation in this direction are shown by the accompanying table:

TYPICAL PLIMMER'S BODIES, INTERNUCLEAR PROTOZOAN FORMS, AND
RUSSELL'S BODIES.

	Present.		
	Few.	Occasional.	Absent
Soft carcinoma of breast, primary, skin unbroken . .	8	5	...
Adenocarcinoma of breast, primary, skin unbroken .	1	...	...
Soft carcinoma of breast, with metastases in axillary lymph nodes	2	1	...
Recurrent soft carcinoma of breast	...	2	...
Ulcerating scirrhous carcinoma of breast . . .	1	...	...
Large fungating carcinoma of breast	...	1	...
Rapidly growing primary soft carcinoma of breast contained Plimmer's bodies in great number; nearly every cell contained one or more well-defined bodies except in the central degenerated portions of the tumor. See Plate IX.	...	1	...
Scirrhous carcinoma of the breast, material from which was not fresh	...	...	1

	Present.		
	Few	Occasional.	Absent
Carcinoma of stomach	...	1	...
" " " metastases in liver	1	...	...
" " " " in mesenteric lymph nodes	...	1	...
" " pylorus	1	...	...
" " " metastases in mesenteric and omental lymph nodes	...	1	...
Adenocarcinoma of rectum with metastases	...	1	...
" " of colon	1	...	...
" " of appendix, with mucoid involvement of peritoneum ; in undegenerated portions of tumor	1	...	...
Mucoid carcinoma of cæcum, involving peritoneum, in undegenerated portions of tumor	1	...	...
Adenocarcinoma of cæcum	1	...	...
Carcinoma of gall-bladder	2	..	...
Secondary carcinoma of liver, ox, only organ examined	1	...	...
Carcinoma of omentum	1	...	...
Adenocarcinoma of uterus	1	...	...
Solid soft carcinoma of uterus	...	1	...
Adenocarcinoma of ovary	2	1	...
" " " protozoan forms in large numbers. (See Plates XI. and XII.)	1	...	...
Case of general carcinosis involving liver, lung, heart, and kidneys, a very acute case	1	...	...
Primary adenocarcinoma of kidney, pig	1	...	.
Hypernephroma from man	2	...	...

RUSSELL'S BODIES, MODIFIED PLIMMER'S BODIES, PROTOZOAN FORMS.

	Present.		
	Few.	Occasional.	Absent.
Squamous epithelioma of skin	...	1	...
" " " cheek	...	3	...
" " " lip	...	3	...
" " " tongue	...	2	.
" " " penis	...	1	...
" " " cervix	...	2	...
" " " vagina	...	1	...
Squamous epithelioma of orbit, cow ; a few atypical bodies giving the reaction of Plimmer bodies, but much larger. (See Plate XIII., Fig. 1)	1	..	...
Multiple sarcoma of skin	1	...	...
Melanosarcoma of skin	3	...	...
Large spindle-celled sarcoma	1	...	...
Spindle-celled sarcoma, metastases in myocardium, horse	1	...	...
Sarcoma of kidney, rooster	1	...	...
Recurrent sarcoma of thigh	1	...	...
Sarcoma of breast involving thoracic wall, dog	1	...	...
Angiosarcoma of brain	1	...	..

PLATE X.

Russell's bodies from carcinomatous
lymph node.
(Oil immersion.)
(Plimmer's method.)
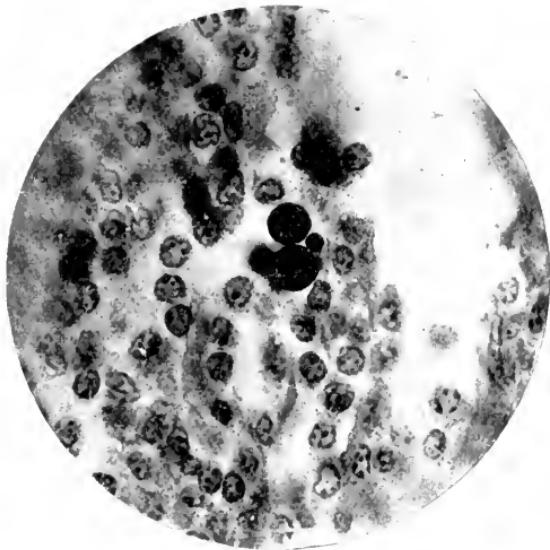
1.

Russell's bodies from enlarged regional
lymph node. (Carcinoma of breast.) (This
node was used to inoculate Dog 18.)
(Oil immersion.)
(Plimmer's method.)
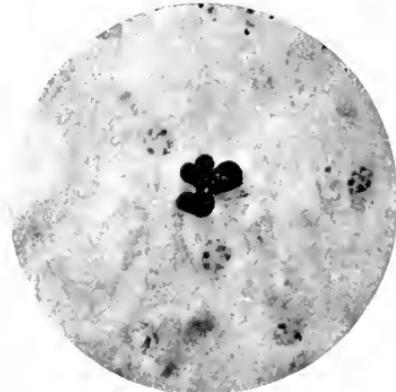
2.

Groups of Russell's bodies from
margin of an epithelioma of skin.
(Oil immersion.)
(Methylene blue.)

3.

PLATE XI.

1.
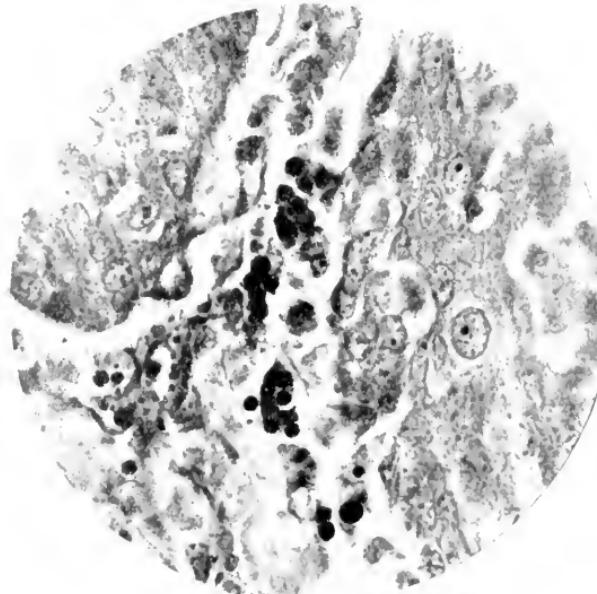
Adeno carcinoma of ovary. Localization of young parasites (Russell's bodies) in the apices of the papillæ. (Plimmer's method.) (M. P.)

2.
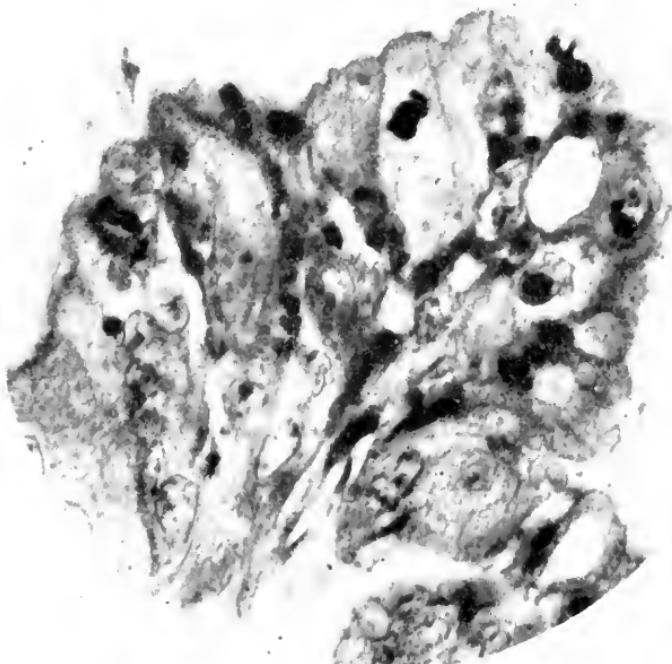
PLATE XII.

1.
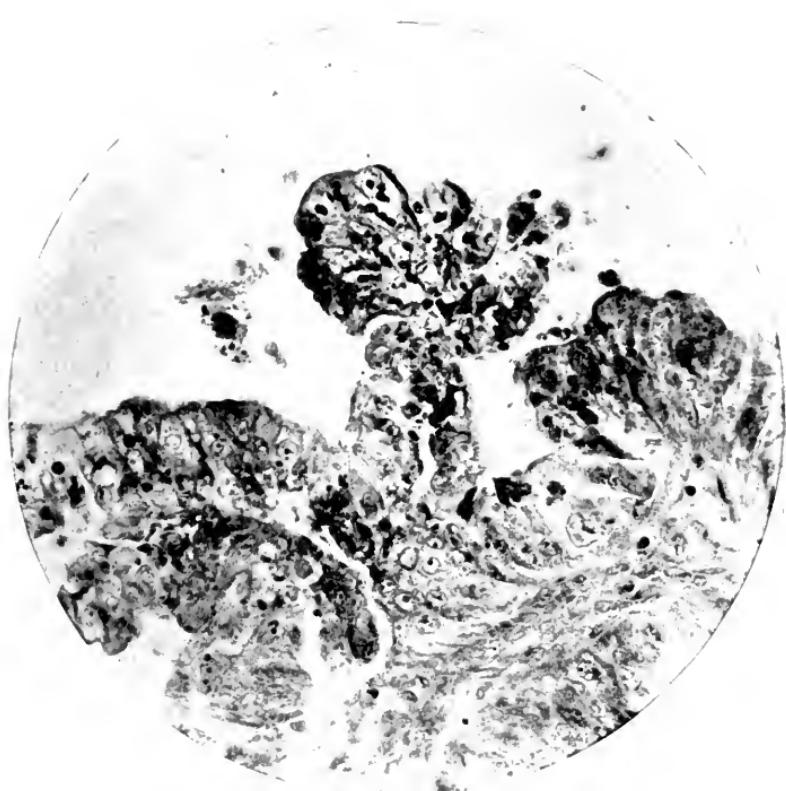
Adenocarcinoma of ovary with inter-cellular parasites. (M. P.) (Plimmer's method.)
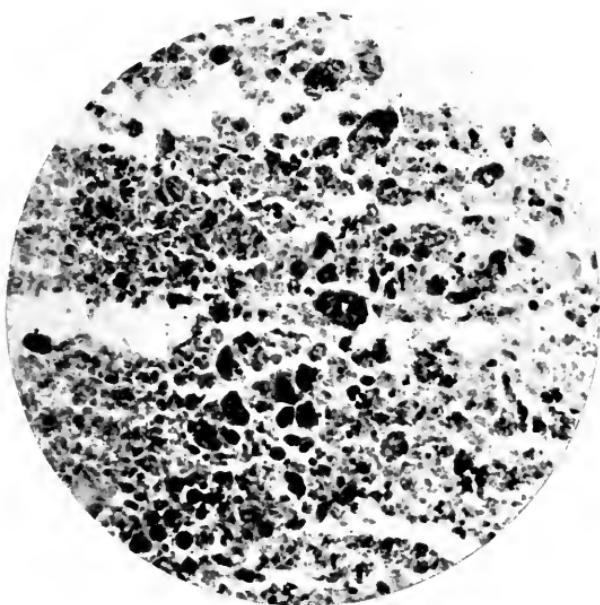
2.

Free parasites in cystic cavity of tumor. (M. P.) (Plimmer's method.)

	Few.	Present Occasional.	Absent.
Round-celled sarcoma of ilium	1	...	...
Malignant lymphoma	1	...	...
Slowly developing lymphoma	1	...	...
Myxoma of breast	1	...	...
" from pylorus of tiger shark (Galeocerdo tigrinus)	1	...	...
Osteosarcoma	1	...	...
" " of jaw, horse	1	...	...
Adenofibroma of breast, rapidly growing, both breasts involved (see text)	1	...	...
Lipoma of abdominal wall	...	...	1
Fibroma from side of sucker (Chasmistes) . . .	...	...	1
" of musculospiral nerve	...	...	1
Colloid struma	...	2	...
Tuberculosis of breast	...	...	1
Chronic cystic mastitis	...	...	1
Syphilitic lymph nodes[1]	...	1	...

In examining the above table it will be seen that in all cases of carcinoma investigated by this method, with the exception of one which was not fresh, Plimmer's bodies were uniformly present. Likewise in all of these tumors Russell's bodies were numerous, especially about the periphery of the tumors and *in the adjacent lymph nodes, even when these contained no epithelial deposits* Such groups of Russell's bodies are shown on Plate X. One tumor, an adenocarcinoma of the ovary, beside containing typical Plimmer's bodies, contains a large number of cellular inclusions resembling Russell's bodies, and many larger forms which show evidence of previous amœboid movement. These are the so-called protozoan forms of the earlier writers. It will be noted on Plate XI., Figs. 1 and 2, and Plate XII., Fig. 1, that these organisms have infected the epithelium at various points, and as a result of the infection a proliferation has occurred which has thrown the epithelium into folds giving the characteristic papillary appearance of such tumors. As a result it is to be noted that the parasites are present in greatest number at the apices of the papillary projections. The fluid in the cavity of this tumor appears to be nearly a pure culture of organisms (Plate XII., Fig. 2). This tumor was hardened immediately after the operation in sublimate, and was brought by the writer from Dresden, where it was obtained over three years ago. One of the cases in which Plimmer's bodies were found was a rapidly growing adenofibroma of the breast. *This case presented no histological evidence of malignancy, but occasional Plimmer's bodies were found lying in the stroma and between the cells of the acini, as well as a few in cells. The patient developed a similar growth in the remaining breast,*

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[1] The organisms found in syphilis closely resemble those of sarcoma. This phase of the question will be reported upon later.

which was likewise operated upon after it had reached a large size, and it
likewise contained a few Plimmer's bodies.

Beside these cases of carcinoma fourteen cases of squamous epi-
thelioma were examined, and all of these contained *atypical bodies*
which gave the staining reactions of Plimmer's bodies, but were much larger
and did not contain the characteristic central bodies.   The appearance of
the cell inclusions from one of these cases is shown in Plate XIII.,
Fig. 1.   The remainder of the list contains fifteen cases of sarcoma—
eleven from man and four from animals—*all of which contained the*
small forms of the organism within the nuclei.   Plimmer's bodies are rare,
and not so well defined as in carcinoma.

In comparing our findings with those of Plimmer, it will be seen
that the results obtained by us completely substantiate his claim that
typical bodies of the nature which he has described are of practi-
cally constant occurrence in carcinoma and sarcoma.   Our list is not
nearly so large as Plimmer's, as we have devoted our principal efforts
to the experimental side of the problem, and simply wished to confirm
or disprove Plimmer's results.   We have not considered it necessary
to examine a greater number of tumors than those employed for ex-
perimental purposes.   Beside the tumors enumerated in this list we
have examined a large number that were fresh, and have been able in-
variably to demonstrate the parasites in the fresh condition.

The recognition of the nature of these bodies and the demonstration
of their presence in 88 per cent. of 1278 cases is a feat so colossal that
it places beyond any question of doubt the significance of these bodies
in the cancerous process.   Not only should the credit of this performance
be freely accorded to Plimmer, but we must also state that the acquisi-
tion of his staining method has thrown an entirely new light upon the
animal experiments which we shall describe later, and has been one of
the most important factors in elucidating the entire problem.

As to whether the morphology of these structures is sufficiently con-
stant to enable their ready recognition the following can be stated :

The bodies may be demonstrated in the fresh state, in which case it
is a matter of considerable difficulty to distinguish them from fat drop-
lets, which they somewhat resemble, but which have a higher refractive
index and do not contain a central structure.   The most minute form
of the organism might be confused with cocci.   In the fresh state the
quarter-grown and half-grown forms appear either as spherical bodies
with very delicate outlines and containing one or two colorless granules
near the centre, or as similar structures of oval form.   They may be
either intracellular or extracellular.   Occasional forms will be met
in which the pale structure of the body is projected in the form
of a pseudopod ; in which case the granules may remain in the larger
portion of the structure or one or two may be found in the projection.

PLATE XIII.

1.

2.

3.

PLATE XIV.
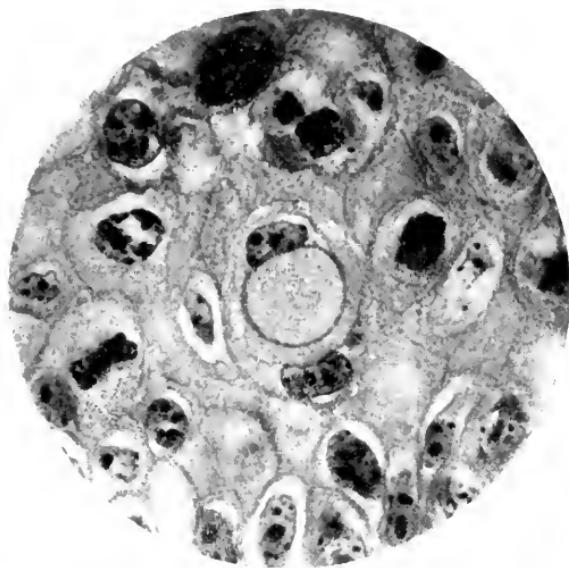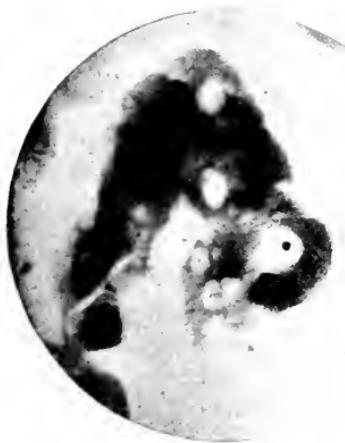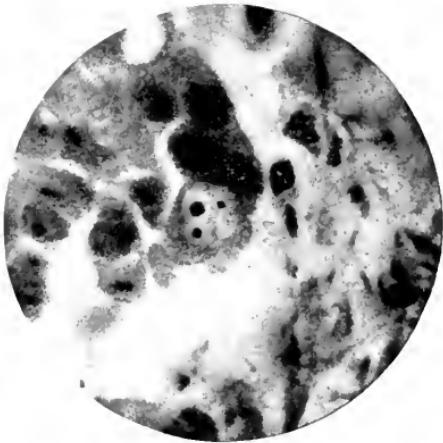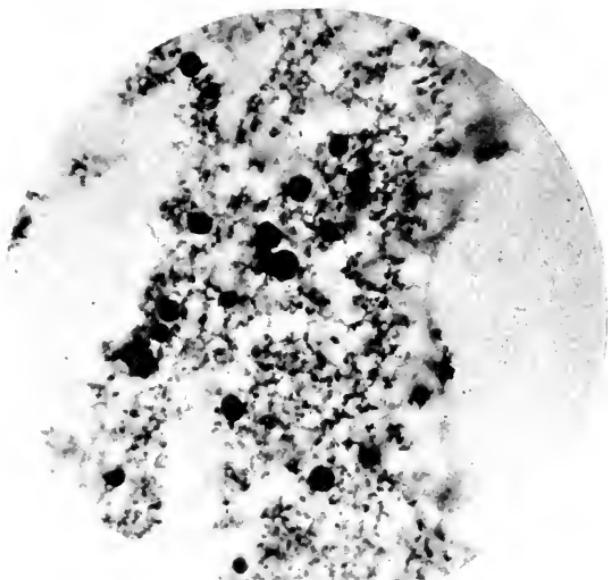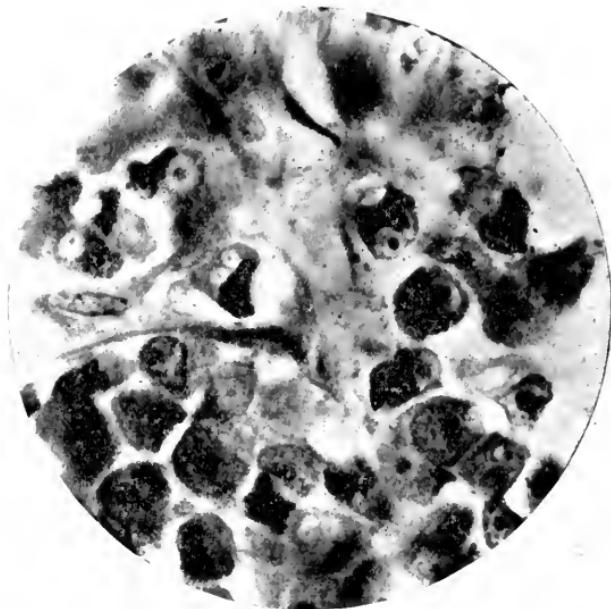
1.
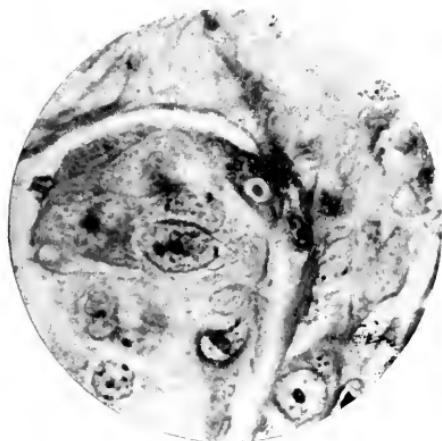
2.
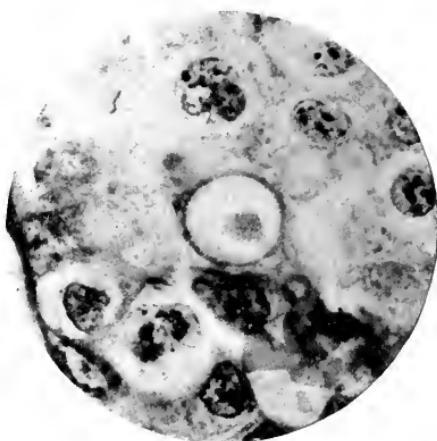
3.
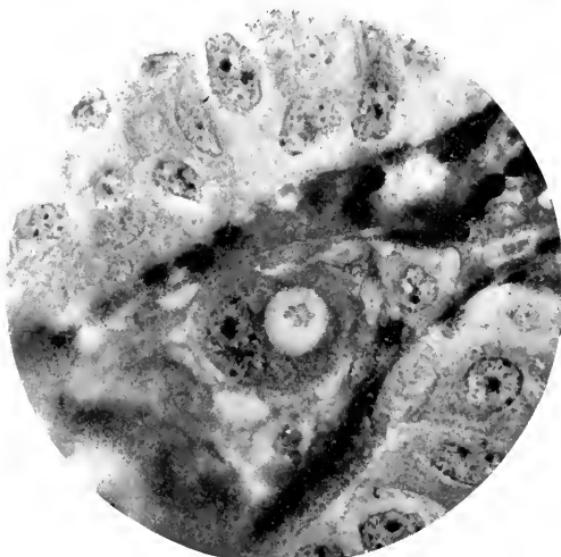
These forms closely resemble the bodies shown in Fig. 2 of the article by Sjöbring in the *Centralblatt für Bacteriologie*, vol. xxvii.

We have never been able to detect any change of form in the intracellular bodies, although scrapings from carcinoma in which they were found have been exposed to various procedures. The extracellular bodies may be occasionally induced to change their form by placing the preparation in a thermostat. In this case we have repeatedly observed that bodies which are spherical changed on the warm stage after a period of some hours, and projected longer and shorter processes. Attempts to stain them in the fresh state have met with varying results. They apparently take on Sudan III., but Dr. Clowes, the chemist of the laboratory, states that this is not a genuine staining reaction.

We find that the organism of vaccine may be stained in the same manner, and we are informed that others have employed Sudan III. as a stain for amœbæ.

Attempts to fix the organisms by heat gave unsatisfactory results, owing to the distortion which they undergo. If cover-slips be made and dried in the air the small, spherical bodies will stain with any of the aniline dyes. The larger forms, however, remain unstained, and appear as spherical or oval clear spaces in the stained material of the cover-slip. The best means to fix them is to make rapid smears after the manner employed in making blood-slips and drop the wet cover-glasses into warm Hermann's fluid or sublimate. They may then be stained with Plimmer's method. We have likewise found that pouring peritoneal fluid which contained them into warm Hermann's fluid or sublimate and treating the coagulum after the manner in which tissue is manipulated gives excellent results, the organisms retaining their form and characteristic appearance. (Plate XIII., Fig. 4.)

The best method for preserving the extracellular forms is by hardening masses of tissue which contain them. An excellent method for hardening the organisms with the pseudopodia projected has recently been described by Eisen in his very excellent article in the *Medical Record* of July 7th of this year. Dr. Eisen has been kind enough to forward us some of his sections, and we can heartily indorse what he has described in epithelioma.

In sections hardened in Hermann's fluid and stained with Plimmer's method the bodies correspond very accurately to the description given by Plimmer. Some of the different types which we have observed are shown on Plate XIII., Figs. 1, 2, and 3, and Plate XIV., Figs. 1, 2, 3, and 4. As to the staining qualities of the organisms, we find that they closely conform to those given by Plimmer—that is, that the central body and capsule of the structure take on a coppery-red or pale rose color. In the case shown on Plate XIII., Figs. 2 and 3, we have succeeded in staining the central bodies with the nuclear stain,

and in some of the cell inclusions only the central portion of the central body takes the nuclear stain, and is then surrounded by a layer of protoplasm, which takes the rose or pink color.

The organisms may appear singly in the cells, or even in large numbers. (Plate XIII., Fig. 3.) We have detected as many as fourteen in one cell. There is no difficulty in detecting the structures in properly hardened and stained material. They can be readily distinguished from vacuoles in the protoplasm by the well-defined capsule and central bodies, their relative uniformity in size, and occasional presence between the cells.

Summing up this phase of the question, it can be unhesitatingly stated that Plimmer's bodies present a characteristic appearance and can be readily differentiated from cell degenerations of the usual type and other structures which they might resemble.

To determine whether or not Plimmer's bodies could be due to cell degenerations, we have carefully examined a large number of sections of well known pathological conditions of known cause, such as tuberculosis and certain bacterial infections, and a large number of animals inoculated with various pathogenic yeasts, and we can state that we have never detected any changes in the epithelial or other cells in this class of diseases which could be confused with Plimmer's bodies.

In attempting to determine the nature of Plimmer's bodies, the fact becomes immediately patent, in reviewing the literature, that many observers have depicted these structures. Scarcely an article has appeared in which the observer has not, more or less accurately, illustrated cell inclusions which are no doubt the characteristic bodies of Plimmer. The slight variations which are encountered in these illustrations are very likely due to the different methods of hardening and staining employed by the different investigators, and the usual subjective equation incident to all illustration by drawings. Figures which are unquestionably intended to illustrate bodies of this nature may be found in a publication of Sawtschenko, *Bibliotheca Medica*, 1895, Abtheilung, D. ii., Heft 4. Those which most characteristically represent Plimmer's bodies are Figs. 18, 19, 30, 51, 57, and 60. In an article published by Jackson Clark, *Centralblatt für Bacteriologie*, vol. xvi., Fig. 6 of Plate III. is a most typical representation of these bodies, and, in like manner, an investigation will reveal more or less characteristic illustrations in the publications of the majority of investigators.

Of especial interest in this connection are the illustrations of Sjöbring accompanying his most recent publication in the *Centralblatt für Bacteriologie*, vol. xxvii. Fig. 1 of this article represents a section through the wall of a *vasa efferentia* in the epididymis. In the protoplasm of the epithelium are shown three typical Plimmer's bodies. This illustration is especially interesting, as the author states it is taken from the

epididymis of an animal from the neighborhood of a fragment of sterile carcinoma which had been implanted in the testicle.

It will, therefore, be seen that many of the observers who have described cell inclusions, in the belief that they were protozoa, have unquestionably seen typical Plimmer's bodies, and it would appear as if Sjöbring, in his most recent publication, was dealing with bodies of at least a very similar appearance.

In all the carcinomata which we have investigated we have found that Russell's bodies could be detected, especially about the periphery of the tumor and in the enlarged regional lymph nodes, even when these were not carcinomatous. In sections stained with Plimmer's method they take on a dense blue-black, but by modifying the stain they can be made a brilliant red, which gives them much the same appearance as they possess when stained with fuchsin. In one case we have succeeded in staining the central bodies of the Plimmer inclusions, and are able to trace a direct morphological relation between Russell's bodies and Plimmer's bodies. In one case of adenocarcinoma of the ovary, which contained a large number of Russell's bodies and protozoan forms, the bodies which correspond to Plimmer's bodies were more or less atypical, probably owing to the hardening agent (sublimate).

From the above it will be seen that Plimmer's bodies are not new structures, but that his hardening and staining methods give them a more characteristic appearance and probably differentiates them in a large number of cases in which, when treated by the ordinary staining methods, they would be invisible.

In form the bodies are almost always round or oval. Occasionally they occur in pairs, in which case they are usually smaller than the single bodies, and present an appearance which is highly suggestive of some form of division. Plimmer describes a budding form of the organism, which, in our experience, is very rare. We have found only one or two bodies which conform to this description.

The fact that certain observers have succeeded in obtaining pure cultures of blastomyces from carcinoma, and the significant experiments of Sanfelice, naturally raise the question as to whether these organisms can be detected in carcinomata. In the examination of our cases we have thus far failed to find any structures which we were willing to consider blastomycetes. During the last two years we have carried out an elaborate investigation of pathogenic yeasts, including Plimmer's organism, Sanfelice's neoformans and lithogenis, the pathogenic blastomyces isolated from a skin lesion by Hektoen, and a similar organism isolated by Gilchrist and Stokes.

A summary of the results of a long series of comparative inoculations with these organisms, as well as a careful morphological comparison, will form the subject of a future publication from this laboratory. The

details of the results will not be entered into here. Suffice it to say that we have never detected a sufficient transformation in the organisms injected to give them an appearance identical with the Plimmer bodies of carcinoma. The nearest approach to such a result is shown in Plate XV., Figs. 1 and 2, which represents yeast cells (Plimmer's) in the lung of a guinea-pig, hardened and stained by his method.

Thus far the distinguishing feature which we have always observed has been the double contoured capsule of the yeast organism, which Plimmer's bodies do not possess. At the same time we have occasionally noted yeast organisms with a single contoured capsule; but in these cases they never presented an appearance which could be confused with a typical Plimmer body. Plate XV., Fig. 1, shows a yeast organism with a single contoured capsule, which, it will be noted, contains no central body. *From a morphological stand-point we have been unable to demonstrate the identity between Plimmer's bodies and transformed yeast organisms.*

The culture experiments in this laboratory have been of a uniformly negative nature. An elaborate bacteriological investigation was carried out by Dr. Pease, former bacteriologist to the laboratory, at the time the tumors were being investigated for the presence of Plimmer's bodies, and in only one case did he succeed in obtaining a culture of a blastomyces. In order, if possible, to find a suitable medium for the blastomyces, in case the negative results were due to unsuitable sub-strata, we prepared and employed sixty-four different varieties, which it may be of interest to enumerate. In this list the term + is used to indicate acidity, and — alkalinity. The figures indicate the units of acidity and alkalinity recommended by the bacteriological committee.

Bouillon neutral.
    "   + 15.
    "   + 5.
    "   — 15.
    "   sugar (free).
    "   glucose.
    "   lactose.
    "   saccharine.
    "   glucose—tartaric acid.
    "   pig liver.
    "   " liver—cancer.
    "   " kidney.
    "   glucose—cancer.
    "   " —tartaric acid—cancer.
    "   dog—cancer.
    "   asparagin.
    "   potash soap.
    "   human glucose—neutral.
    "   tartaric acid—glucose (human).
    "   fucus crispus.

Milk.

Serum bovine.
    "   human.
    "   dog.
    "   ascitic.
    "   hydrocele.
    "   abdominal fluid.

Urine.

String-beans in aqua dest.
    "   "   " Niagara water.
Bean stems—glucose—tartaric acid.

Beerwort.

Potato infusion.

Potato.

PLATE XV.
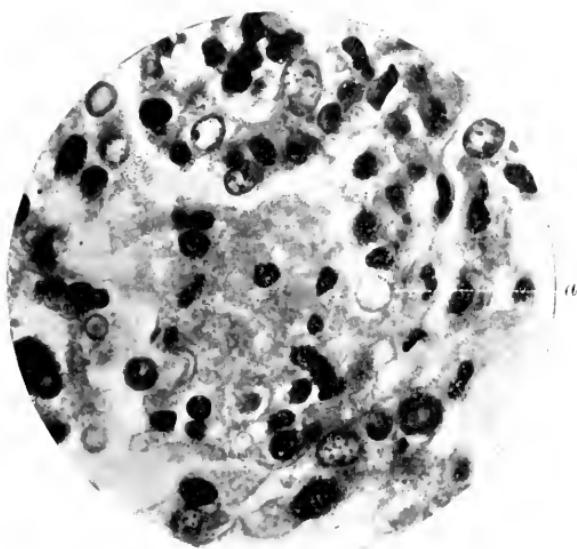
1.

Plimmer's yeast in lung of guinea pig. Hardened and stained according to Plimmer's method. At *a*, an organism with single contour. (Oil immersion.)
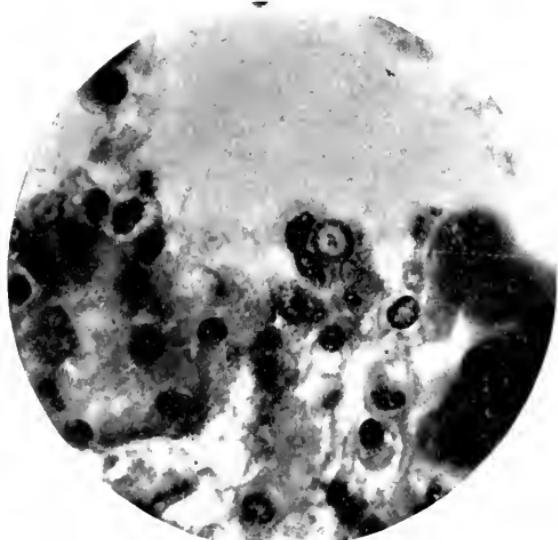
2.

Field from same section as Fig. 1. Yeast with thick capsule in act of budding. Central bodies. (Oil immersion.)

Agar neutral.
" + 15.
" — 15.
" potato.
" glucose.
" glucose—tartaric acid—cancer.
" beerwort.
" serum.
" hay.
" glucose—hay.
" glycerin.
" fucus crispus.
" cabbage water.

Gelatin neutral.
" 15.
" potash soap.
" beerwort.

Hay infusion.
" glucose water.

Sugar water.
Glucose water.

Fucus crispus water.
" " hay infusion.

Cabbage water.

Lettuce water.

Bread.

Human fat.

Casagrandi.

Nahrstoff (Hayden).
" " soda.

In our experimental inoculations of animals we have usually been able to obtain the blastomyces by cultivation after the inoculation. The majority of lesions which we have produced have been those of typical blastomycetic mycosis with abscess formation, or characteristic granulomata containing the organism.

Having thus determined to our satisfaction that the yeast organism was not the essential cause of carcinoma and sarcoma and could not be confused with the organism we had already observed in fresh scrapings of carcinoma and in our experimental animals, and having already convinced ourselves of the identity of the organisms found in the fresh state and the forms known as Russell's bodies, Plimmer's bodies, and protozoan forms in the tissues, our attention was called to the possible relation between these inclusions in cancer and the vaccine bodies observed after inoculation of the cornea with vaccine virus, by an article by Dr. C. Gorini, in the *Centralblatt für Bacteriologie*, September, 1900, vol. xxviii., No. 8/9, entitled " Ueber die bei der mit Vaccine ausgeführten Hornhautimpfung vorkommenden Zelleinschlüsse und über deren Beziehungen zu Zellinklusionen der bösartigen Geschwülste." We had already noted the similarity of Russell's bodies to the illustrations of inoculated corneas, and it remained for us to harden and stain the cornea of rabbits which had been inoculated with vaccine virus after Plimmer's method. The result of our comparative test in this case shows not only that the half-grown form of the vaccine organism is very closely related in appearance to the bodies of Plimmer, but that the bodies of Russell in carcinoma and the protozoan forms in

carcinoma, all have their prototypes in the various stages of development of the vaccine organism. (See Plate XVI., Figs. 1 and 2.)

This striking confirmation of Gorini's observation was more than doubly confirmed when, after the recent announcement of Dr. M. Funk, in the *British Medical Journal* of February 23d of this year, on the cultivation of the vaccine organism, we repeated his experiment and found that the organism of vaccinia, while undergoing development, shows essentially the same phases we had already noted in the organisms observed in fresh scrapings of cancer and in the peritoneal fluid and blood of cancer cases.

Having thus convinced ourselves that the organism with which we were dealing was a protozoon belonging in the same group with the vaccine organism, it remains to be seen what evidence can be produced to show that these protozoa, which are a constant occurrence both in the fresh material of cancer and which we had cultivated and identified in the tissue under the form of Russell's bodies, Plimmer's bodies, etc., are the cause of cancer.

We have found it necessary to carefully restain the tissues of all our earlier animals with Plimmer's method, and, as this work is not yet complete, we deem it advisable to withhold the complete series until we are in a position to consider certain phases of the question which will require an investigation of tissues from other diseases, which are possibly protozoan infections.

That the protozoon of cancer is capable of producing even in man lesions of a very different nature from infection of the epithelium, seems to be strongly indicated by the following observation:

Case 108. Mrs. E., aged forty-five years. Well-developed cancer of right breast, with axillary lymph nodes, operated upon February 5, 1901, at Buffalo General Hospital by Dr. Park. The case in question attracted our attention because of a pigmented pustule beneath the skin of the right axilla. The clinical notes in brief are as follows:

Three years ago observed a retraction of the nipple. Six weeks ago noted a well-defined tumor in the right breast. At the same time a small nodule was felt beneath the surface of the skin of the right axilla. This developed in a region which was subject to irritation by the edge of the patient's corset.

In removing the tumor Dr. Park carried a flap up into the axilla, removing the axillary lymph nodes and including the pustule above mentioned. The tumor reached the laboratory one hour and a half after the operation. An inspection of the tissues removed shows them to consist of an enlarged right breast with a thickened and retracted nipple. The flap of skin removed is included between two curved incisions. At a distance of about five inches from the nipple there is an elevation of the skin somewhat larger than a pea. The skin cover-

PLATE XVI.
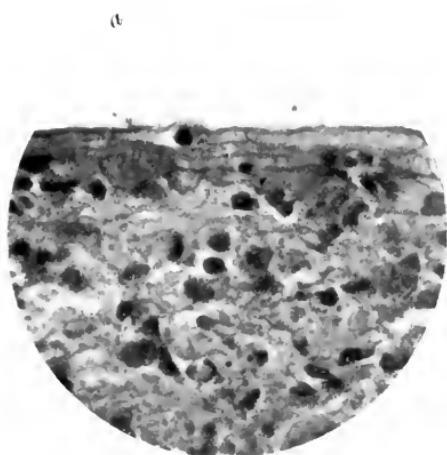
1.

Recent vaccination of cornea (third day). At *a*, young vaccine organism (analogous to Russell body) entering epithelial cell of cornea. (Oil immersion.) (Plimmer's method.)

2.

Section of vaccinated cornea (seventh day). (Plimmer's method.) At *a* and *b*, bodies analogous to Plimmer's bodies ; *c* and *e*, younger forms of parasite. At *d*, a small organism within the nucleus of an epithelial cell.

ing it is glazed, and on palpation it is found to contain fluid.   On open-
ing this pustule a small amount of dirty red fluid escapes.   Examined
in the fresh state with the microscope this material is found to consist
of leucocytes, red blood-corpuscles, and a large number of cells, from
five to ten times the diameter of a red globule, possessing coarse and
fine granulation.   Some of them contain highly refractive bodies some-
what finer than ordinary cocci, but the greater number have embedded
in their protoplasm poorly defined, hyaline, pale-green, spherical bodies,
somewhat smaller than red blood-corpuscles.   When treated with acetic
acid these hyaline bodies and the granules of the cells become more
distinct, and nuclei may be made out.   Beside these cells are a large
number of ordinary pus cells, which form the principal constituent of
the fluid.

On cutting into the breast it is found to consist for the most part of
fat, through which runs sharply-defined bands of carcinomatous tissue.
At no point in the structure is a well-defined tumor mass.   From the
most vascular portion of the carcinoma fresh scrapings were made.
Under the microscope these scrapings are found to consist of closely
packed epithelial cells with vesicular nuclei.   A large amount of free
fat is found in the preparation, but the cells show very slight evidence
of fatty degeneration.   Between the fat droplets are a considerable
number of small, greenish hyaline bodies, which, in our experience, can
be recognized from fat by the slight difference in refractive index
and color.

Portions of the tumor were hardened in Hermann's fluid.   On
examining the axillary fat a group of five or six enlarged lymph nodes
may be detected.   On dissecting these out and incising them they are
found to contain more or less extensive deposits of cancer.   Sections
of these were hardened in sublimate and Hermann's fluid.

Fresh examination of scrapings from these lymph nodes reveals the
presence of bodies which correspond to what we have recognized as the
fresh Plimmer body.   They are composed of pale fluid protoplasm, and
contain a group of fine granules.   Their outlines are well defined, and
in many cases they appear to be sending out projections.   In some of
these bodies the protoplasmatic granules show active Brownian move-
ment.   An examination of the sections from the tumor and lymph nodes
shows the case to be one of soft carcinoma of the breast with metastases
in the axillary lymph nodes.   Stained with Plimmer's method a consid-
erable number of the various forms already mentioned can be found—
Russell's bodies, Plimmer's bodies, and protozoan forms.   A section
through the pustule hardened and stained with Plimmer's method reveals
a most interesting condition.   It consists of an abscess in the subcutis.
Upon the surface the papillæ of the cutis are normal, but directly above
the abscess three or four of the papillæ are seen to be hypertrophied

and extend into the subcutaneous tissue. The abscess appears to be made up for the greater part of masses of spherical bodies somewhat smaller than leucocytes. There is no apparent inflammatory reaction about the periphery. The bloodvessels show no engorgement. (See Plate XVII.) Under high dry power the abscess is found to be composed of leucocytes with horseshoe nuclei and a large number of spherical and oval, deeply-stained bodies, which closely resemble large Russell's bodies. (See Plate XVIII.) Beside the leucocytes and these small spherical bodies are a large number of large, oval, and spherical cells with one or two nuclei. Many of these contain deeply-stained spherical bodies, somewhat smaller than the free spherical bodies in the tissue. Others of nearly the same size contain a large number of small hyaline bodies which do not take the stain. These, we are inclined to believe, are the sacs of the parasite. (See Plate XVIII.)

Beside the small forms and large sacs we have found a number of spherical bodies about four times the diameter of the leucocyte, which stain brilliantly with the Bordeaux red of the preparation. In a number of these bodies we have found evidences which are strongly suggestive of segmentation, after the manner recognized in malarial parasites. The bloodvessels within the focus contain, beside red blood-cells, large numbers of the deeply stained oval and spherical Russell's bodies. In some cases the endothelium of the capillaries is greatly swollen and contains one or more of these deeply stained bodies.

We are inclined to believe from this observation that this pustule is the result of embolic deposit of the parasites from the cancer of the breast, and we would interpret it, pending further observation, especially in the light of our animal experiments, as indicating that the organism of cancer is capable of producing other lesions than that of epithelial infection.

The material with which our animals were inoculated consisted of peritoneal fluid from cases of abdominal carcinosis, fluid from the interior of malignant ovarian cysts, sterile cancer, and dried sterile cancer and lymph nodes rubbed up with salt solution. Some of these latter contained metastatic deposits of cancer, but a number were simply the enlarged lymph nodes, in which we had already detected Russell's bodies. In each case the fresh material was carefully examined before and the presence of parasites was determined. The presence of parasites was likewise verified in hardened sections of the material where this was possible

The following is summarized from the complete list of animals, which will appear in the second part of this communication :

PLATE XVII.
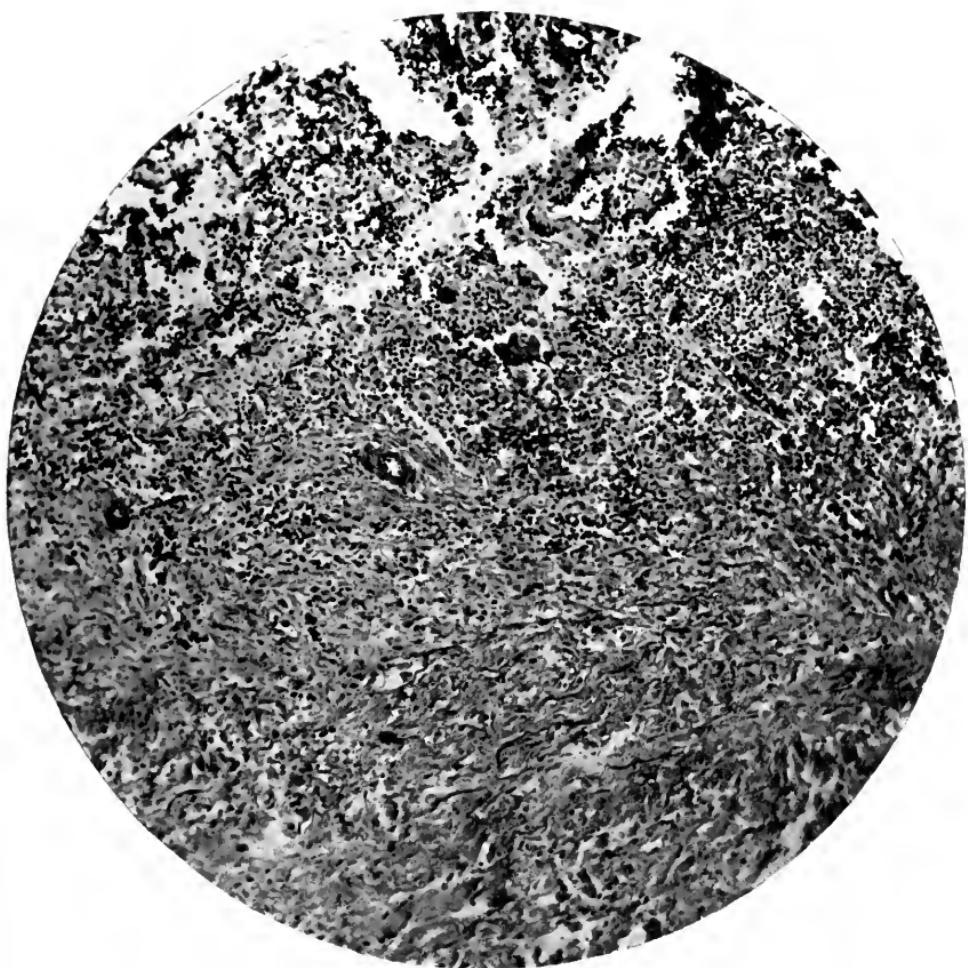
Embolic skin pustule from carcinoma of breast. Deeply stained spherical
bodies are protozoa. (Low Power.)
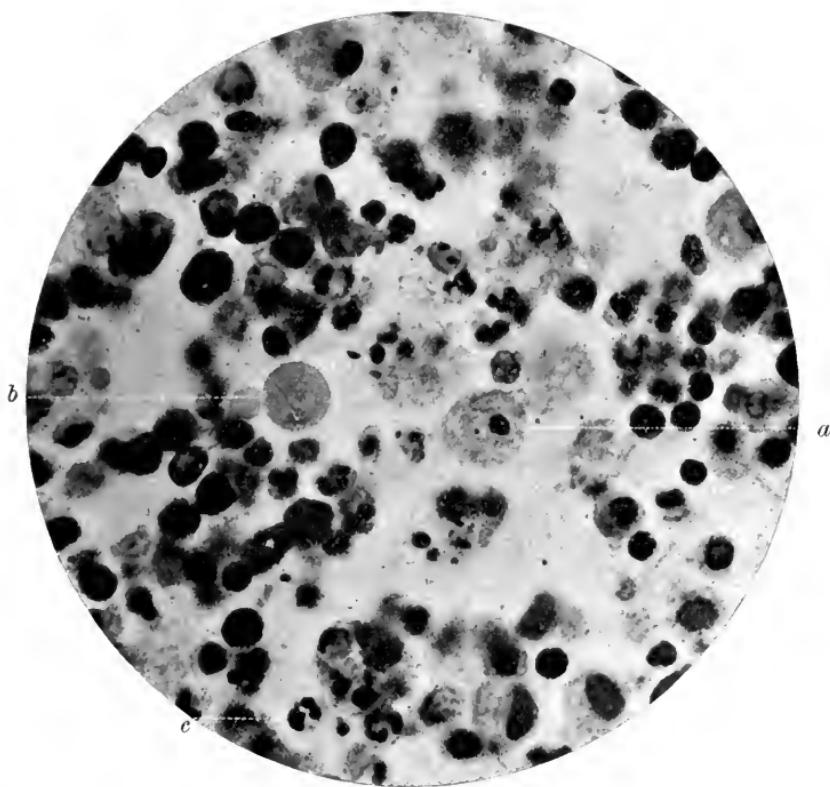
PLATE XVIII.

Field from center of skin pustule, shown on Plate XVII. At the center remains of spore
cysts. One at *a* contains a single deeply stained body (young parasite). At *b*, a half-
grown organism stained red. *c*, a leucocyte. Remainder of field filled with
young spherical and oval organisms and polymorph nuclear leu-
cocytes. (Plimmer's method.) (Oil immersion.)

Animals Inoculated with Material and Cultures from Carcinoma and Sarcoma in Man.

2 guinea-pigs inoculated in the jugular with peritoneal fluid, died in 22 and 19 days respectively.

14   "   inoculated in the peritoneum with peritoneal fluid, died in an average of 58 days.

1 guinea-pig inoculated in the right eye with peritoneal fluid, died in 10 days.

1   "   inoculated in the jugular with filtered serum, died in 304 days.

1   "   inoculated in the jugular with cancer mush, died in 15 days.

4 guinea-pigs inoculated in the peritoneum with cancer mush, died in an average of 57 days.

11   "   inoculated in the peritoneum with dried lymph nodes, died in an average of $45^4/_{11}$ days.

7   "   inoculated in the peritoneum with sarcoma, died in an average of $92^2/_7$ days.

2 rabbits inoculated in the ear vein with peritoneal fluid, died in 93 and 17 days respectively.

1 rabbit inoculated in the ear vein with filtered serum, died in 164 days.

1   "   inoculated in the peritoneum with cancer mush, died in 292 days.

1   "   inoculated in the peritoneum with sarcoma, died in 278 days.

1   "   inoculated in the mediastinum with sarcoma, died in 41 days.

1   dog   inoculated in the peritoneum with peritoneal fluid, died in 64 days.

1   "   inoculated in the peritoneum with sarcoma, died in 160 days.

Animals Inoculated from Animals Infected with Parasites from Carcinoma and Sarcoma in Man.

Pig 23, inoculated in abdominal wall with lymph gland and peritoneal fluid from Pig 16, died in 9 days. Case I., adenocarcinoma of the omentum.

" 55, inoculated in abdominal wall with several nodes from Pig 52, also portion of old original tumor, died in 4 days. Case LVII., squamous epithelioma of skin.

" 72, inoculated in abdominal wall with B-pig 67-a, 2 c.c. node emulsion in water, died in 37 days. Case L., enlarged axillary lymph nodes recurring sarcoma breast.

" 75, inoculated in abdominal wall with $2^1/_2$ syringes B-pig 66-a, nodes powdered in sterile water, died in 59 days. Case L., enlarged axillary lymph nodes recurring sarcoma breast.

" 73, inoculated in abdominal wall with 2 c.c. nodes in water B-pig 64-a, died in 48 days. Case L., enlarged axillary lymph nodes, recurring sarcoma breast.

" 76, inoculated in abdominal wall with A-pig 68-a, nodes powdered in water, died in 17 days. Case LXI., carcinomatous lymph nodes from axilla accompanying well-developed carcinoma of breast.

" 15, inoculated in the abdominal wall with 2 c.c. fluid from peritoneum Pig 13, died in 8 days. Case XXIII., recurrent sarcoma thigh.

The points of interest are that 14 guinea-pigs, inoculated in the peritoneum with peritoneal fluid containing the organism, gave an average

length of life of fifty-eight days; 4, inoculated in the peritoneum with
cancer mush, gave an average length of life of fifty-seven days; 11, in-
oculated in the peritoneum with dried cancerous lymph nodes, gave an
average length of life of forty-five and four-elevenths days; 6 guinea-
pigs, inoculated with peritoneal fluid and lymph nodes from animals
which were infected in the above manner, gave an average length of
life of twenty-nine days—a little more than half the length of time for
the animals inoculated directly from man.

This unquestionably shows the increased virulence of the organisms
after passing through one animal. We are continuing these experiments
in modified form and shall report upon them later.

The average length of life for rabbits inoculated in various regions
with the different forms of material used shows the greater resistance
of this animal to infection. In our most recent experiment we have
succeeded, by growing the organism in a collodion sac (suggested by
Dr. Clowes) in the peritoneal cavity of a rabbit, in so increasing the
virulence of the organism that a healthy rabbit inoculated in the ear-
vein died of general hæmatogenous infection from the organism after a
period of fifteen days. (Rabbit 56 of the list.)

It will be shown from these experiments that animals are readily in-
fected when inoculated with carcinomatous material as well as pure cul-
tures of the organism. The peritoneal fluid used in all of these inocu-
lations was bacteriologically sterile, and consisted essentially of a pure
culture of the organism. Two animals—one guinea-pig and one rabbit
—which were inoculated with filtered serum from which the organism
had been removed, gave a respective length of life of 304 days and 164
days. The organs of these animals were free from parasites.

The macroscopical pathological findings in these cases were generally
uniform. All the animals were greatly emaciated and presented, on
opening the abdominal cavity, collapsed intestines, reddened peritoneum,
enlarged peritoneal lymph nodes, and a moderate amount of clear, straw-
colored fluid. The lungs were dark red in color, collapsed; heart con-
tained but small amount of blood; the spleen was enlarged and red-
dened; the liver in many cases was hyperæmic, and the kidneys were
generally injected.

One dog (Dog 18) presented a large lymphoma of the spleen. This
case will be considered separately. Dog 8, inoculated from sarcoma,
Case XXIII., shows typical metastases of sarcoma in all of the regional
lymph nodes.

*In almost all cases a fresh examination was made of the peritoneal fluid,
the organs, and the blood, and, wherever made, large numbers of the para-
sites could be readily detected, as already described.*

Two guinea-pigs and two rabbits, inoculated in the jugular with peri-

toneal fluid, show macroscopical lesions in the lungs very closely resembling those reported in our Pig 1—that is, minute white dots scattered through the pulmonary structure, usually localized in the neighborhood of the bronchi. Sections from these lungs, stained with hæmatoxylin, show the presence of multiple beginning adenocarcinoma of the bronchi.

These we should interpret as beginning adenocarcinoma of the lung in 4 animals, making, with our Case I., 5 animals in which the injection has been followed by infection of the bronchial epithelium. One guinea-pig presents a condition of the lungs and liver which we wish to interpret as primary carcinoma of those organs, and 1 dog presents a lymphoma of the spleen, the size of a large hazel-nut, which we also attribute to the inoculation of the animal with dried lymph nodes from a case of carcinoma. The tumor cells in all of these animals contain the characteristic forms of the parasite.

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1. THORACIC ANEURISM. 2. CARCINOMA OF SUPERIOR MAXILLA. 3. CHOLELITHIASIS AND SUPPURATIVE CHOLECYSTITIS. 4. INGUINAL HERNIA OF (a) BLADDER; (b) CÆCUM.[1]

By Bern B. Gallaudet, M.D.,

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1. *Thoracic Aneurism.* This case was an aneurism of the thoracic portion of the left common carotid artery. The patient was a male, aged thirty-nine years, and came under observation in November, 1899. His general condition as regards strength, health, etc., was perfect. Previous history as regards disease of all kinds was absolutely negative.

At the age of twenty-three years, sixteen years before admission to Bellevue Hospital, he had received a pistol-shot wound in the left side of the neck, which healed without complication. Nothing developed until the fall of 1897, when a swelling was noticed under the scar, well down in the neck. From that time the swelling increased in size, slowly but steadily, and with increasing severity of pressure-symptoms, pain, dyspnœa, and coughing, which interfered with sleep and were beginning to undermine the patient's health. Medical treatment had been tried for six months, but without relief.

Examination : On inspection a swelling, about the size of a lady apple, was observed in the left side of the neck close to the sterno-

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clavicular articulation.   Palpation showed the existence of the regular
symptoms of a sacculated aneurism and also that the aneurism was
slightly overlapped by the sternomastoid muscle.   On gentle manipu-
lation the overlying tissues appeared loose, while active motions of the
neck in all directions were normal.   Auscultation confirmed the diag-
nosis of aneurism and also showed a downward extension into the
thorax.   Pulsation in the left radial artery was synchronous with that
of the heart, this probably excluding the left subclavian artery as the
point of origin.   There were no signs of communication with the
internal jugular veins nor were any bony parts involved.

The question of treatment was now to be considered.   The patient
was in good condition ; his arteries, heart, lungs, and kidneys were
normal.   As medical treatment had been unavailing, there was the
choice between an operation and doing nothing, since such measures as
needling and introducing wire did not seem to be indicated.   Further-
more, the patient was steadily growing worse and was desirous, as were
his friends, of having an operation performed, fully appreciating its
possible fatal outcome.   If it had been merely a question of ligation
based on a definite size of the tumor there might have been less doubt
as to what to do ; but the somewhat indefinite limits of the aneurism
certainly suggested possibilities of failure if ligation were attempted
with an ordinary incision, even if the latter were deepened by removal
of pieces of the sternum and clavicle.   It was, therefore, decided to
operate and to make an unusually large exposure of the aneurism,
with the idea not only of having plenty of room for ligation, but also
of possible extirpation of the sac.

The operation was performed ten days after admission and was as
follows :

The incision followed the anterior border of the sternomastoid muscle,
extending from its mid-point to the middle line of the sternum, crossing
the sternoclavicular joint.   From this point a second incision was
carried outward, parallel to and just below the clavicle, well beyond
the middle of the bone.   The soft parts were then retracted at the apex
of this triangle and at the outer end of the clavicular incision suffi-
ciently to use a wire-saw, by which were divided first the clavicle at
the point indicated, and then the sternum and cartilage of the first rib,
the latter being cut through close to the former.   The flap was then
dissected upward and outward, the dissection being carried under the
sternomastoid, which thus formed part of the flap, the bony portions
being the inner half of the clavicle, the sternoclavicular joint, and the
adjoining portion of the sternum.

The raising of this flap was extraordinarily difficult on account both
of dense adhesions and hemorrhage, almost every cut with knife or
scissors and even blunt separation of the tissues being followed by
profuse venous oozing and spurting.

After the flap was raised the aneurism was found to extend mesially
over the common carotid and downward under the first rib.   It was also
bilobed, a bit of fascia constricting it, so that the smaller part lay over
the scalenus anticus muscle.   The stiffness of the sac and the presence
of the first rib prevented the finger from getting in under it from any
direction.   The rib and cartilage were then resected as far out as the
subclavian vein, the constricting band removed, and adhesions separated

below.   These procedures allowed a more extended palpation, which showed that the sac reached downward over the left innominate vein and that it arose neither from the aortic arch nor from the subclavian artery.

It was then determined to ligate the left common carotid, but the patient's condition forbade anything more.   In clearing the sac several profuse venous hemorrhages had occurred.   These, together with the previous hemorrhages and the length of time elapsed—now more than four hours—necessitated infusion and stopping the operation.   The wound was packed with sterile gauze, several clamps left *in situ*, the flap brought down, and a large dressing applied.

The next morning the patient was in good condition and desired a continuation of the operation when told that it was not yet complete.

Five days later he was again etherized and the wound opened.   The thin layer of granulation tissue, which had spread itself more or less completely over the parts, was wiped away and the clamps left at the first operation removed.   The lower end of the left carotid was then exposed and ligated about a quarter of an inch above its origin, which was followed by immediate cessation of pulsation within the sac.   This procedure, however, was one of no small difficulty, owing to adhesions and hemorrhage, and required nearly an hour's time.

Had the operation been terminated then the patient would certainly have survived and possibly made a more or less permanent recovery, provided the conditions of the wound permitted.   These were somewhat difficult to deal with.   The sac was now enormously enlarged and projected not only in the neck but also between the cut edges of the sternum and first rib, thus absolutely precluding any replacement of the flap as originally formed.   To replace the flap would have necessitated removal of the bony portions and stretching the soft parts over the aneurism.

Primary union would have been impossible and healing could take place only by means of a long granulation process, attended by probable sepsis, to say nothing of secondary hemorrhage.

Extirpation of the sac was accordingly decided upon, and, as a preliminary step, the upper part of the artery was exposed and ligated. An attempt was then made to raise the aneurism from its bed by retracting it mesially and dissecting in under it along its outer border. After about half an hour, however, the amount of adhesions and venous hemorrhage encountered showed that removal in that way was impossible.   Since the artery was tied in two places it was decided to split the sac and remove it piecemeal.

Time for infusion having been allowed, the sac was cut into and split, the upper and lower portions of the internal jugular vein having been previously sufficiently cleared of adhesions to permit clamping should it be necessary on account of a possible communication with the vein.   The vein should have been ligated, but the patient's condition demanded the loss of no time.

On splitting the sac it was found to contain a quantity of laminated fibrin loosely arranged concentrically around the wall, which was thin.

During the removal of some of this fibrin a sudden violent venous hemorrhage from within the sac took place, which was stopped at once by clamping the jugular at the places prepared.   The sac was then

partly cleared of blood and clot in an endeavor to find an opening into the vein.

All further investigations, however, were then brought to an end by the quiet death of the patient.

A post-mortem examination, not obtainable later, might, it is true, have been made at once, even if a trifle irregular; but, to speak frankly, disappointment at the fatal result was sufficiently keen to cause entire loss of interest.

This case is reported simply because of its general interest as touching on the question of extirpation of aneurisms. I fear that there can be but little learned from it. There was nothing in the physical signs at the examination indicative of the difficulties to be encountered. Therefore, until these thoracic aneurisms can be more accurately mapped out it would seem best either always to be prepared for adhesions and hemorrhage—which, of course, may not be found—if an operation is undertaken or not to operate at all. In this particular case no operation should have been performed, but this was certainly not positively evident, in the author's judgment, before the operation.

2. *Carcinoma of Superior Maxilla.* Male, aged forty years, came under observation early in January of this year.

The growth occupied the roof of the mouth and involved the gums and alveolar processes of both maxillæ, extending from the first molar tooth of the right side to the canine tooth of the left. It also involved the anterior half of the hard palate of the right side. The mass was soft, friable, nearly filled the mouth, and was constantly bleeding, with an offensive discharge. General health was greatly depreciated, with marked cachexia. The tumor had grown rapidly, beginning as a small lump behind one of the front teeth only eight weeks previously. The nasal fossæ were normal. No glandular enlargements.

It was evident that if removal were to be attempted three things were desirable, viz., to minimize hemorrhage, to exclude blood and discharge from the air passages, and rapidity of removal, which last would be greatly facilitated by adoption of the first two.

Accordingly, on January 16th, the external carotid artery was ligated on both sides, a tracheotomy tube inserted through the cricothyroid membrane, and the pharynx packed with a large sponge with string attached.

The upper lip was then split in the middle line and the growth extirpated by use of rongeur forceps. Venous oozing was considerable, but ceased as soon as the limits of the tumor were reached. No other form of hemorrhage occurred.

The portions of bone removed included the alveolar process of the right side as far back as the second molar tooth, the alveolar process of the left side as far as the first bicuspid tooth, and the contiguous portions of the hard palate of both sides as far back as the posterior third, thus leaving a bony bridge in that situation. Healthy bone was removed on all sides of the tumor, as indicated by its firm resistance to the biting of the forceps. The nasal fossæ were normal as well

as the antrum of the right side, which was necessarily opened from below.

The cavity was then packed and the lip sutured. The entire operation lasted about an hour and a half. The pharyngeal sponge was removed after a few hours. Recovery was uneventful. The tracheotomy tube was removed on the second day, the wound healing inside of a week. The incisions over the arteries closed by primary union.

The pathologist's report was that the tumor was a carcinoma, originating probably from the mucous membrane covering the gum; hence, strictly speaking, a *squamous-celled epithelioma*.

The patient's present condition is one of great comparative comfort. He eats and sleeps well and has gained considerable weight. There is very little falling in of the face, which can later be easily corrected by a plate. Cicatrization is not yet complete. There is at present no evidence of a recurrence, which, however, will probably take place, and this the patient understands.

My reasons for reporting this case are two: First, the rather unusual character of the growth, sarcoma being the common form of malignant epulis or tumor starting on the gum; and the second is to call attention to the great advantages secured in these operations by preliminary tracheotomy, packing the pharynx, and ligating the carotids—procedures which many operators regard at least as superfluous and unnecessary, but which, in this case at all events, would have been indispensable.

3. The case of *cholelithiasis* and *suppurative cholecystitis* was remarkable in that the patient, a woman, aged thirty-five years, gave no symptoms indicative of these conditions for a period of eight or ten weeks, during which time, however, she had marked jaundice and evening rise of temperature to between $101°$ and $102°$ F., clay-colored stools, etc. No local pain, nor tenderness, nor hyperleucocytosis were present.

She was finally transferred, October 22, 1900, to the surgical side (Bellevue Hospital) for an exploratory incision. This was performed, and a moderately distended gall-bladder was found and opened and nearly an ounce and a half of pus evacuated. Two stones were then extracted, and a third was found impacted in the neck of the bladder and extending to the junction of the cystic and hepatic ducts, the former, of course, being greatly distended. The stone was removed after some manipulation. The stones were about three-eighths of an inch in diameter. More pus followed the removal of the last stone, showing a state of suppuration of the bile-ducts. Cholecystostomy was performed and recovery was uneventful. Bacteriological examination of the pus showed the ordinary mixed pyogenic infection.

4. *Right Inguinal Hernia of the (a) Bladder.* This subject has attracted considerable attention during the past few years and the present case is reported on that account.

The patient, referred to me by Dr. McSweeny, of this city, was a male, aged fifty-seven years, and very stout. The tumor appeared four years before admission to the hospital, in September last, rather suddenly and from no apparent cause. It increased in size slowly but steadily. Complete reduction was impossible during the last three years, but increase in size just before and decrease in size just after micturition were noticed. These symptoms, of course, indicated the probable diagnosis, which was confirmed at the operation, which the patient came in for owing to increasing pain and discomfort.

The hernia was a large one and extended into the scrotum. When the sac was opened careful examination of the protruded portion showed it to be fully one-half of the bladder. Reduction was greatly facilitated by withdrawal of about six ounces of urine through a catheter introduced through the penis. Nothing abnormal was found as to the sac, the tunica vaginalis being intact. Closure of the wound; uneventful recovery.

The hernia of the (b) *cæcum* deserves a passing mention, owing to its rarity, and especially this case, as it was on the left side. The diagnosis was not made until the sac was opened, the symptoms having been those of a regular reducible inguinal hernia of good size, but with commencing pain, discomfort, and constipation. As the patient was not in first-class condition, no exploration was made to determine the exact condition of the mesocolon, etc., the part being at once returned and the wound closed. Recovery uneventful.

This must have been simply a congenitally too long ascending mesocolon, or a condition of *incomplete revolution* of the large intestine resulting in a mesially placed cæcum and ascending colon, the mesentery and small intestines lying over to the right of the vertebral column. Transposition of viscera was excluded by a careful examination after the operation.

Finally, in connection with these hernia cases, I should like to mention a method of operating which I have used during the past four or five years and with great satisfaction. Without claiming any especial originality for it, I have not seen it described anywhere. It is simply this:

A Bassini operation is done in all respects except that the aponeurosis of the external oblique is sutured *under* the cord instead of over it, this feature being the same as in Halsted's operation, and in my opinion lending additional strength to the abdominal wall, which is thus made solid, so to speak, under the cord.

THE CARBOHYDRATES OF THE URINE IN DIABETES INSIPIDUS.

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RECENTLY Rosin and v. Alfthan reported their results from the esti-
mation of the unfermentable carbohydrates of the urine in diabetes
mellitus. They make the interesting statement that beside the well-
known excretion of glucose in pathological quantities there is in this
disease a marked increase in the unfermentable carbohydrates. The
daily amount of the total urinary carbohydrates under normal circum-
stances was never, in their experience, notably more than 5 grammes,
and averaged roughly about 1.6 grammes. Similar amounts have
been found with normal subjects by several other workers. On the
other hand, the smallest daily amount of unfermentable carbohydrate
alone in fermented diabetic urine was found by Rosin and v. Alfthan
to be about 9 grammes, and in some instances they demonstrated as
much as 20 grammes. They conclude from these results that diabetes
mellitus can no longer be looked upon as a pure " glucose disease,"
but is rather a disturbance of carbohydrate metabolism in general.

The method used was precipitation of the carbohydrates by benzoyl
chloride in the presence of sodium hydrate. The carbohydrates come
down after prolonged shaking of the mixture as benzo-esters, and when
the method is properly carried out the precipitate can be fairly readily
collected on a filter, washed, dried over sulphuric acid, and weighed.
Since the method was described by Baumann it has been investigated
by Wedenski, v. Fodor, Roos, Lehmann, Salkowski, Baisch, and Le-
maire, and it has been shown that the results obtained indicate with
a very fair degree of accuracy the amount of carbohydrate in the
urine, when this is small, as is the case under normal circumstances.
The precipitate seems to be composed very largely of the esters formed
from the carbohydrates, and although there is a slight admixture of
nitrogenous matter and salts, and perhaps the esters are in small part
not the product of carbohydrates, the error is not sufficient to interfere
with the use of the method as an index of variations in the carbohydrate
excretion.

Several points in the papers by Rosin and v. Alfthan arrest one's
attention. In the first place, they note that it is of interest to learn
whether the unfermentable carbohydrates are still excreted in large
amounts in diabetes mellitus when the glucose excretion has disappeared

under the influence of diet. This might prove to be a point of serious importance in prognosis. Further, v. Alfthan states that in one case of diabetes insipidus which he had under observation, but which at the time of his report had not been completely investigated, the carbohydrates seemed to be increased. If an increase could be shown in a considerable percentage of cases of diabetes insipidus it might indicate an interesting relation between this affection and diabetes mellitus. These suggestions led me to make a series of estimations of the esters formed by this method in the urine of a patient in Dr. Stengel's wards at the University Hospital.

The man, who was an intelligent clerk, aged twenty-seven years, was admitted January 7, 1901, with a history of rather sudden onset, in June, 1900, of polyuria and excessive thirst. This had persisted and had been accompanied by decided loss of weight—about thirty pounds. He stated that his physician had examined his urine repeatedly and had told him that he had diabetes, but he had had no notable increase of appetite and no other symptoms that would strongly indicate the existence of diabetes mellitus, and the urine when he came to the hospital contained no sugar and no acetone, or diacetic acid ; albumin and casts were likewise absent. The daily amount of urine was, however, above 4000 c.c., and he had excessive thirst. At the time of admission it was readily discovered that the man was in the early stages of typhoid fever, and he went through a typical mild course of this disease. It seemed possible from the history that he gave that he actually had diabetes mellitus and that the glycosuria had disappeared under the influence of the typhoidal infection. It was with the thought in mind that under such circumstances the benzoyl chloride method might prove to have actual diagnostic value that the estimation of the esters was first undertaken, for a persistent excess in their amount may perhaps be present under such conditions, and if present would probably be a valuable indication of the actual existence of diabetes mellitus in the temporary absence of glycosuria. This point is certainly worthy of investigation, as is the amount of esters found by this method in the urine of those persons who are constantly ready subjects of alimentary glycosuria, those who have hereditary predisposition to diabetes mellitus or other metabolic disturbance, or those who for any other reason are suspected of being ready subjects of diabetes mellitus. The further course of the case under discussion has demonstrated that it is not diabetes mellitus, but, as seemed highly probable from the beginning, diabetes insipidus. Sugar has always been absent from the urine, and the man has had no symptoms excepting undue thirst and polyuria, barring those of typhoid fever. The daily urine now averages about 4500 c.c.

The results obtained in estimating the esters may then be considered solely in their relation with diabetes insipidus. I was unable for a number of reasons to carry out the work until the man had practically begun his convalescence from typhoid fever ; the diuresis had been a little reduced by this time through limitation of his fluids so far as was compatible with comfort.

The conclusion that may at once be drawn from the figures in the following table is that the carbohydrates were not increased; the figures obtained by control estimations of the esters and by coincident nitrogen estimations for a part of the time (Kjeldahl method) are given for reasons which will be noted later:

Date.					Amount of urine in c.cm.	Esters in gms.	Nitrogen in gms.
February 7	.	.	.	.	3670	2.752	. . . .
" 8	.	.	.	.	3820	{ 6.494 { 6.229	. . . .
" 11	.	.	.	.	3280	{ 2.427 { 2.099	. . . .
" 12	.	.	.	.	3370	{ 2.830 { 2.897	. . . .
" 13	.	.	.	.	3450	{ 2.484 { 2.691	14.076
" 14	.	.	.	.	4050	{ 2.277 { 2.754	13.923
" 15	.	.	.	.	4100	{ 1.517 { 1.413	12.628
" 16	.	.	.	.	2120	{ 1.611 { 1.484	8.814
" 18	.	.	.	.	3400	{ 1.666 { 1.768	15.803
" 19	.	.	.	.	1800	{ 1.512 { 1.368	11.551
" 20	.	.	.	.	1840	{ 1.325 { 1.288	9.991

The figures of February 8th are, to be sure, somewhat abnormally high, but they are so wholly at variance with all the other results in this case that I am inclined to think that there was an error in technique. The close correspondence of the control results speaks against this (the two estimations were carried out separately from the beginning), but even though the figures be correct the result is such an isolated one that it deserves no special comment, and all the other figures are wholly within the normal range. So far, then, as this case goes the results speak against the probability of any marked increase in the urinary carbohydrates in diabetes insipidus. One would certainly be inclined to anticipate this from the beginning, as no other similar relation between this disease and diabetes mellitus has been demonstrated. I should not be surprised, however, were a rather high excretion of urinary carbohydrates shown to be present in many cases of diabetes insipidus as a result of the excessive diuresis alone, not as an indication of disturbed carbohydrate metabolism. An increase of the urinary carbohydrates in this disease, unless very marked, could scarcely be looked upon as evidence of any primary disturbance of the metabolism of carbohydrates, for it is well known that flushing the system

with large quantities of water will cause a marked increase of the nitrogen output, and I have shown that this persists over a considerable period, and perhaps constantly so long as the excessive amounts of water are taken ; a positive nitrogen balance may even be converted into a nitrogen loss in this way. Similar results were obtained by Ter Gregorianz and Karchagin in normal subjects in nitrogen equilibrium, and by Matzkevich and Grusdiev in subjects of typhoid fever who showed a negative nitrogen balance. It is wholly probable, then, that the constant flushing in diabetes insipidus may carry off an abnormally large amount of carbohydrates in the urine, and that a portion of the increase in diabetes mellitus which was observed by Rosin and v. Alfthan may be due to the same cause, though this alone could not produce the very marked change seen in the latter affection. Another fact which would lead one to expect an increase with the free diuresis of diabetes insipidus is that actual glycosuria may be produced by some diuretics which act directly upon the kidney. That increase or decrease in the diuresis does cause an increase or reduction in the urinary carbohydrates is, I think, shown fairly definitely in the table given above. From February 15th to February 20th, inclusive, the man's fluids were reduced to as low a point as was possible without causing serious distress. The excretion of urine remained high on the 15th, though he certainly got only about 3000 c.c. of fluid in both food and drink during that day. On the 16th, 17th, 19th, and 20th the excretion was far lower than at any other period of observation. (The amount of urine on the 17th was 1780 c.c., but the esters were not estimated.) The average figures for the esters up to February 14th (excluding the result on February 8th, which is very probably incorrect) is 2.598 grammes ; for the period from February 15th to February 20th, inclusive, 1.499 grammes. Hence the restriction of fluids reduced the esters to 58 per cent. of their previous amount. If the two periods be made according to the drop in the excretion of urine it is interesting to note that the average of esters for the period from February 7th to February 15th, inclusive, is 2.410 grammes, while for that from February 16th to February 20th, inclusive, is 1.502 grammes, while the average amount of urine in the same periods is 3650 c.c. and 2290 c.c. respectively. The average amount of esters in the second period is, then, 62 per cent. of the average in the first period, while the average amount of urine in the second period is 63 per cent. of that in the first period. This correspondence between the diuresis and the amount of esters, while its exactness is probably largely accidental, is too close to allow one to overlook the fact that the two bear a decided relation to each other. Diet could have played no part in this, as absolutely the only change made in the man's regimen was in the amount of water given him. Throughout the whole series of estimations he was given

exactly the same food in constant quantities; the food consisted of milk, eggs, butter, bread, and sugar. The amount of carbohydrates in the urine is, therefore, evidently influenced to a very decided degree by the amount of urine passed and very probably, as suggested by Rosin and v. Alfthan, by the diet also. It is quite possible that excessive diuresis is sufficient to explain the result obtained by v. Alfthan in his case of diabetes insipidus, and it would certainly be necessary to demonstrate a very marked increase in order to show by this method even a probable relation between diabetes mellitus and diabetes insipidus so far as carbohydrate metabolism is concerned. If further investigation should show a moderate increase of esters in diabetes insipidus I should be very strongly inclined to attribute this increase wholly to the abnormal diuresis. The man whose case I report did not show any increase at the time of the investigation, but it would not surprise me if another series of estimations undertaken in the same case after six months or a year had passed demonstrated larger quantities of carbohydrates than those reported here, for the man was, as stated, convalescing from typhoid fever when these estimations were made. A marked tendency toward the laying on of tissue after severe acute diseases is demonstrated both by clinical observation and by exact determinations of the intake and outgo in such subjects. This man was increasing in weight and was evidently retaining nitrogen, as his food contained about 15 grammes of nitrogen while his excretion in the urine was notably more than 14 grammes in only one instance. It seems to me that he was very probably excreting less carbohydrates also than would be the case under ordinary circumstances. At any rate, this possibility is of sufficient interest to deserve investigation in other instances.

The nitrogen was estimated for a number of days coincidently with the esters for two reasons: To see whether there was the same relation between the amount of fluids taken and the nitrogen excretion that I have previously referred to; and to see whether there was any relation between the nitrogen excretion and the excretion of carbohydrates. The latter point was chiefly of interest because v. Alfthan stated that he thought that the unfermentable carbohydrates may be looked upon as derived from body protein or from glycogen—i. e., that they are produced in the body. If they are derived from body protein their excretion should show some relation to the nitrogen excretion if the nitrogen intake is kept constant, as was practically the case with this man. In regard to the latter point the ratio of esters to urinary nitrogen was as follows: February 13th, 1 to 5.44; February 14th, 1 to 5.53; February 15th, 1 to 8.5; February 16th, 1 to 5.69; February 18th, 1 to 9.2; February 19th, 1 to 8.02; February 20th, 1 to 7.65. There was a general tendency for the nitrogen and the esters to rise and fall together, as most of the urinary solids tend to do in a

general way. There was not the slightest tendency, however, toward the maintenance of any fixed ratio in the excretion of the two, and so far as such an observation goes it points against the formation of the urinary carbohydrates in this case from body protein. So complex a question cannot be settled in this off-hand manner, however, and this point in the figures is not worthy of much insistence. The question of the origin of the carbohydrates will be touched upon again at the end of this paper. The nitrogen excretion shows, in general average, the same rise and fall with increase or decrease of intake of fluids that I have previously described, and I think that it is quite thoroughly established by the observations to which I have referred and by my own earlier results that excessive water ingestion increases protein metabolism—a fact which is, as I have previously insisted, of much importance in explaining the clinical results of immoderate use of fluids.

There are one or two points concerning the benzoyl-chloride method that may be worthy of mention. In the first place, it is absolutely essential to have a good preparation of benzoyl chloride—a fact which is not sufficiently insisted upon by those who have previously discussed the method. Some of the difficulties in the use of the method described by several authors were not improbably due to the use of impure benzoyl chloride. I tried in all ways that I could devise to obtain a satisfactory precipitate with what was thought to be a perfectly satisfactory preparation, but had no success in about two weeks' work. I then secured some benzoyl chloride from another source, and afterward met with absolutely no difficulty in carrying out the method. The first specimen was undoubtedly faulty, though it was not evident in what way, and I made no serious attempt to learn what was wrong. In carrying out the method one should be careful to shake the mixture gently at first in order to avoid producing an emulsion. If shaken gently for ten minutes, or thereabouts, and then more vigorously for about twenty or twenty-five minutes, the esters precipitate extremely well and can be washed readily. I found it unnecessary to shake the mixture for "at least one hour," as recommended by a number of writers. Finally, Salkowski recommended that the mixture be shaken for a half-hour and then stood aside overnight before filtering. This is, I think, unsatisfactory. I have had good flocculent precipitates become sticky and impossible of filtration after such a procedure. The esters tend to become sticky after standing even when they have been washed and placed in a closed vessel over sulphuric acid.

The figures for control estimations were introduced into the table merely to show that absolutely exact results are not obtained by the method. It has been the general experience that control estimations are likely to show variations in results as large as 10 per cent. or more.

My results show this in most instances. Two estimations were made every day after the first, the whole process being carried out separately in each case, even in precipitating the phosphates before adding the benzoyl chloride. Exactly the same amount of urine, of benzoyl chloride, and of sodium hydrate was used in each estimation, the mixtures were shaken for the same length of time, cooled in the same manner, filtered coincidently, and each was washed just to the point where the filtrate became neutral, yet the decided variations shown were not avoided. These variations are, however, not sufficient to make the method of questionable value when used only as an index and when, as in the work herein reported, small variations have no influence upon the conclusions reached.

v. Alfthan states that his results in estimating the esters in a normal subject throughout a series of twelve days showed figures varying from 1.5 grammes to 5.1 grammes. My patient showed much more constant excretion. When taking large quantities of fluid the esters varied only between 2.099 grammes and 2.897 grammes, exclusive of the wholly erratic result on February 8th. The amount fell when the fluid was reduced, but there was only slight subsequent variation, the figures ranging only between 1.768 and 1.288. Since this man was on constant diet, and there is no statement that such was the case with v. Alfthan's (normal) subject, who showed such marked variations, it seems to me extremely probable that the amount of carbohydrates in the normal urine depends largely upon the diet, and that these carbohydrates are in large part at least derived from the food rather than formed in the body. I would say again, however, that this question is still widely open.

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CONCLUSIONS BASED UPON THREE HUNDRED AND THIRTY
OUTBREAKS OF INFECTIOUS DISEASES SPREAD
THROUGH THE MILK–SUPPLY.

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In view of the importance of milk as an article of diet for all classes, but especially infants, invalids, and the sick and convalescent, it is perfectly natural that much attention should have been given to the study of this food-stuff, and that of late years the sanitarian and bacteriologist should have found it a profitable field for research.

Few countries until recently have deemed it necessary to do more than prevent adulteration of the milk, and some of the legislators appear to think that as long as the milk has not been skimmed or watered, and contains the standard of total solids and fats, we need not worry about the germs we eat or drink. This may be a pleasing reflection to persons who do not know that such hydra-headed diseases as scarlet fever, diphtheria, and cholera infantum have been disseminated in the milk-supply, that typhoid fever epidemics have been thus caused, and that milk may be the vehicle of the germs of tuberculosis and other infectious diseases and morbific agents.

Time will not permit me to do more than briefly point out some of the circumstances under which milk may be the cause of disease.

1. Sour milk, or milk which is on the point of turning, is very liable in infants, children, or persons with feeble digestion to produce gastric and intestinal catarrhs of an acute or chronic character. In the more acute cases, in bottle-fed children, we have the phenomena of cholera infantum. The causes of untimely acidity of the milk are improper feeding of the animals, dirty milk-pans and rooms, unclean udders and teats, and a high temperature.

Every consumer of milk has doubtless observed the presence of more or less foreign matter found at the bottom of the vessel or bottle in which it is kept; indeed, it is a matter of such common occurrence that it hardly excites our attention. If these sediments are subjected to microscopical examination we will find that they are composed of epithelial débris, hairs of the cow, organic and inorganic dust particles, bacteria, fungi, and spores of every description, and last, but not least, excrementitious matter from the cow, which adhering to the udder, or other parts of the animal, gained access to the bucket in the act of milking. Unfortunately, fully 90 per cent. of the bacteria found in

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[1] Abstract of a paper read before the Section of Hygiene and Epidemiology of the International Medical Congress, Paris, August, 1900.

such specimens are fecal bacilli, which multiply with astonishing rapidity and hasten decomposition of the milk. Dr. Plaut found, as a rule, that in warm weather the so-called fresh milk delivered in the morning has already passed the period of safety and is unfit for use by young children, on account of undue germ development, and sees in this the most frequent cause of cholera infantum and the summer diarrhœas in bottle-fed children.

In April and May, 1898, Dr. E. A. de Schweinitz, of the Biochemic Laboratory of the Department of Agriculture, examined thirty-one different samples of milk from as many dairy wagons in Washington. Of these one showed only about 4000 bacteria per c.cm.; one, 2500; five others between 10,000 and 15,000; six between 30,000 and 50,000, and the remainder more than 50,000 per c.cm., in several instances running over 115,000 per c.cm. In those cases where the number of bacteria per c.cm. was small it is fair to presume that the milk was collected with considerable care; the other cases, he adds, speak for themselves.

As a matter of fact, Bitter, an authority on sanitary milk, claims that the maximum limit for milk that is fit for food is 50,000 germs per c.cm. On this basis the milk from only about thirteen out of thirty-one dairies in Washington examined by Dr. de Schweinitz was fit for food. Dr. Turner, the Dairy Inspector of the District, during the fiscal year ending July 1, 1899, examined bacteriologically 117 different samples of our market milk, and found only 52 of the 117 samples to contain less than 50,000 per c.cm.; indeed, some of the samples showed a higher number of bacteria than the sewage water of the city, which statement, he adds, " is not pleasant to ponder over."

2. Milk may be rendered unfit for use and cause sickness in children by reason of improper food of the animal, or while the animal is being treated with strong remedial agents, which may be excreted in the milk. The symptoms of poisoning from arsenic, copper, iodine, lead, mercury, tartar emetic, atropine, colchicum, croton oil, strychnine, veratrum viridis, etc., has been thus observed.

3. Milk itself may be morbific as the product of a diseased animal. Dr. Busey and myself have elsewhere pointed out that inflammatory conditions of the udder and teats, especially the condition known as garget, are doubtless responsible for a large number of cases of pseudo-diphtheria and other septic infections. The milk of animals suffering from acute specific enteritis, puerperal and other septic fevers, foot-and-mouth disease, cowpox, anthrax, pleuropneumonia, rabies, and tetanus has also been known to produce sickness in the consumer.

4. It has been shown by Ernst, of Harvard, that three out of twenty-five samples of Boston milk transmitted the germs of tuberculosis in the animals experimented upon, and Dr. Fries found that the ordinary

market milk of Copenhagen proved infectious in six out of twenty-eight rabbits, showing a corresponding degree of danger to delicate infants, and of which Dr. Busey and myself have collected a large amount of clinical evidence.

5. Milk may acquire infective properties after it leaves the udder of the animal.   Numerous instances have been observed in which outbreaks of typhoid fever, scarlet fever, and diphtheria, by their sudden and explosive character, affecting families living in streets and localities supplied by the same milkman, naturally pointed to the milk-supply as a common cause.   Dr. Michael Taylor, however, was the first physician (in 1857) to point out definitely that cow's milk might serve as the medium of spreading typhoid fever from a dairy where the disease prevailed.   In 1867 he also showed that scarlet fever might be distributed in the same way.   In 1877 Mr. Jacob traced a diphtheria epidemic at Sutton to the milk-supply, and in 1872 Macnamera traced an outbreak of cholera at Calcutta to an infected dairy.   These facts could not fail to sharpen the powers of observation in others, and in consequence similar outbreaks were more frequently reported, so that Mr. E. Hart, the editor of the *British Medical Journal*, was enabled to present to the International Medical Congress held in London in 1881 the history of fifty outbreaks of typhoid fever, fifteen of scarlet fever, and seven of diphtheria, all traceable to the milk-supply.   In a similar communication made before the International Medical Congress at Paris, in 1900, the writer presented his conclusions based upon the tabulated histories of 330 outbreaks of infectious diseases spread through the milk-supply ; these outbreaks consist of 195 epidemics of typhoid fever, 99 epidemics of scarlet fever, and 36 epidemics of diphtheria.

It has been demonstrated by numerous bacteriologists that disease germs may not only survive, but in many instances actually proliferate, in the milk, and it is not a difficult matter to point out the many ways by which these germs gain access, especially when some of the employés are also engaged in nursing the sick, or are suffering themselves from some mild infection while continuing their duties, or are convalescent from the disease.

It is quite conceivable how animals wading in filth and sewage-polluted water may infect the udder with the germs of typhoid fever and through it the milk.   We can also appreciate how infected water may convey the germs by washing the utensils or by deliberate adulterations.   Infection may also take place through the agency of scrubbing-brushes, dishcloths, exposure to infected air, and the agency of flies.

Of the 195 epidemics of typhoid fever tabulated by me there is evidence in 148 of the disease having prevailed at the farm or dairy.   In

sixty-seven instances the infection probably reached the milk by percolation of the germs into the well-water with which the utensils were washed; in sixteen of these the intentional dilution with water is a matter of evidence. In three instances the bacillus coli communis and the typhoid germs were demonstrated in the suspected water. In seven instances infection is attributed to the cows wading in sewage-polluted water and pastures; in twenty-four instances the dairy employés also acted as nurses; in ten instances the patients while suffering from a mild attack, or during the onset of the disease, continued their work, and those who are familiar with the personal habits of the average dairy hands will have no difficulty in surmising the manner of direct digital infection. In one instance the milk-tins were washed with the same dishcloth used among the fever patients. In two instances dairy employés were connected with the night-soil service, and in another instance the milk had been kept in a closet in the sick-room.

Of the 99 epidemics of scarlet fever the disease prevailed in sixty-eight instances, either at the dairy or milk farm. In six instances persons connected with the dairy either lodged in or had visited infected houses. In two instances the infection was conveyed by means of infected bottles or milk cans left in scarlet-fever houses. In seventeen instances the infection was conveyed by persons connected with the milk business while suffering or recovering from the disease, and in at least ten instances by persons who acted as nurses while handling the milk. In three instances the milk had been stored in or close by the sick-room. In one instance the cans had been wiped with an infected cloth. In nineteen instances the infection was attributed to disease of the milk cows, such as puerperal fever and inflammation of the udder and teats; but these outbreaks were probably not genuine scarlet fever, but a so-called streptococcus or staphylococcus infection, the symptoms of which closely resemble those of scarlet fever.

Of the 36 outbreaks of diphtheria tabulated there is evidence that the disease prevailed at the dairy or farm in thirteen instances. In three instances the employés continued to handle the milk while suffering themselves from the disease. In twelve instances the disease is attributed directly to the cows having inflammatory conditions of the teats and udders. These instances, however, may be regarded as typical examples of streptococcus and staphylococcus infection, giving rise to a form of follicular tonsillitis or pseudodiphtheria, often difficult to distinguish clinically from true diphtheria or scarlet fever.

It is interesting to note that of the 330 epidemics analyzed by me 243 have been recorded by English authors, 52 by American, 14 by German, 11 by Scandinavian, and 5 each by French and Australian writers. This is probably due to the fact that the English and Ameri-

cans usually consume raw milk, while on the Continent the milk is rarely used without being boiled.

A review of the evidence in milk contamination both in this country and Europe shows that the laws which have been enacted to protect the public deal largely with the prevention of milk sophistication, and even in this respect have fallen short of their aim; indeed, it is doubtful whether legislation in matters of this kind is as effective as public education. The importance of a pure milk-supply was recognized as early as 1878 in connection with some of the milk-cure establishments in Germany. The system then originated has been improved by time and experience and lately introduced into several of our larger cities. Such a sanitary dairy was inaugurated in Washington in 1897. The farm and herd, the employés and general manipulation of the milk, are under the supervision of a committee appointed by the medical society and subject to frequent, unannounced inspection. As a result of strict cleanliness and attention to details the average number of bacteria per cubic centimetre during the year 1899 was 6485 in the raw milk against 52,000 per c.cm. as found in the market milk; but it must be remembered that this is only one dairy, whereas at the close of the fiscal year of 1899 there were in force 152 permits for the maintenance of dairy farms in the District, 390 for the maintenance of dairies, and 600 for the importation of milk; hence there is ample room for the establishment of sanitary dairies, which appear to offer by trade competition the best solution of an important problem. Those who are familiar with the surroundings of our milk farms and the habits of the average dairy employés need no arguments for the necessity of sanitary reforms and additional legislation upon the subject. To indicate the value of milk inspection to the health of the community, I may say that in 1893 there were not less than 451 deaths from diarrhœal diseases of children under five years, while in 1898, when the inspections extended over only about one-third of the source of our milk-supply, the number of deaths from the same cause was but 231, showing a decrease of about 50 per cent.[1]

The importance and value of this work, according to Dr. Woodward, was also demonstrated during the past year by the discovery of an outbreak of scarlet fever due to the presence of an undiagnosed case of this disease on one of the farms which supplied milk throughout the city. Before this outbreak, however, was checked the number of cases traced to this milk-supply amounted to sixty-five. The ability of the Health Department to check the outbreak was due entirely to the law regulating the sale of milk enacted in 1895, upon the recommendation of the Medical Society of the District of Columbia.

[1] Report of the Health Officer of the District of Columbia, 1899.

LARYNGEAL HEMORRHAGE FROM AN APPARENTLY NORMAL LARYNX.

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The spitting of pure blood or other expectoration streaked with blood is to be considered not as a disease but as a symptom to be found in many and various pathological conditions. Yet this symptom, when unprovoked, impresses the patient in whom it occurs with the idea that he is suffering from tubercular disease of the lungs, and in a large majority of cases this impression is correct. It is, however, fortunate that hemorrhage from the larynx, leading to the expectoration of either pure blood or blood-streaked mucus does sometimes occur in curable cases, but it is only exceptionally that the bleeding can be traced to an otherwise normal larynx. In tuberculosis, in syphilis, in cancer, and other diseases which lead to ulceration we frequently find corrosion of bloodvessels which may cause serious if not fatal hemorrhage. In hemorrhagic laryngitis there is frequently more or less oozing of blood, though never to any great amount; and the lodgement of sharp-pointed foreign bodies or other traumatism, such as fracture of one of the laryngeal cartilages or the hyoid bone, may be productive of a rather severe amount of hemorrhage. It must be conceded, however, that cases of laryngeal bleeding, unprovoked by some local cause, are exceptionally rare, and in a rather careful search through the literature since 1890 I have been able to find only six cases. These few cases I give in abstract.

No. 1. Terras[1] reported a case of bleeding from the larynx occurring in a girl, aged twenty years, who had not yet menstruated. With the laryngoscope an eroded vessel was found close to the base of the right arytenoid cartilage.

No. 2. Charles Geraert[2] reports a case of laryngeal hemorrhage occurring during an attack of hoarseness. The bleeding-point was located at the juncture of the middle and anterior third of the left vocal cord.

No. 3. Lubet-Barbon[3] reports a case in which there was marked oozing of blood from the right vocal cord, in a patient who suffered from cirrhosis of the liver.

No. 4. Von Geyer[4] reports the case of a woman, aged forty years, who had been hawking clear fluid blood for the past seven weeks.

[1] Meeting of the Société Francaise de Laryngologie, etc., May, 1895.

[2] La Belgique Méd , 1895, No. 42.

[3] Journal of Laryngology, Rhinology. and Otology, 1898, p. 149. Abstract.

[4] München. med. Wochenschrift, April, 1898.

Examination of the larynx showed a bleeding bluish-red tumor about the size of a currant, just below the petiolus of the epiglottis. This was removed by thyrotomy, but very shortly afterward returned. It was again removed, this time interlaryngeally, and a bleeding vessel was found underneath the tumor which was now seen to be simply a small clot of blood.

No. 5. Howard S. Straight[1] reports two cases of laryngeal hemorrhage.

CASE I.—A man, aged thirty-seven years, had had repeated hemorrhages from the throat for fourteen years ; at first they occurred very infrequently, but during the last seven years they had been coming on at intervals of from a few weeks to a few months. He had never suffered from any catarrhal trouble except a slight hypertrophic rhinitis, and a general examination revealed nothing abnormal. The bloodvessels, however, of the larynx, epiglottis, and base of the tongue were seen to be considerably engorged. The first examination did not discover the actual point of bleeding, though made within a few hours after he had expectorated blood. The bleeding came on after singing, which exercise also increased the engorgement of the laryngeal bloodvessels. It was thought that the bleeding most surely came from the larynx, though the actual point was not discovered.

CASE II.—A man, aged thirty-five years, had expectorated blood at widely varying intervals for the last sixteen years. Up to the time of examination the bleeding was never profuse, and the only abnormality which could be detected either locally or generally was a bleeding-point consisting of a minute ruptured bloodvessel, situated in the anterior third of the left vocal cord. The bleeding kept up in spite of all treatment, always coming from the cords without any apparent cause, and the man finally died from profuse hemorrhage of the larynx.

In glancing over the cases it will be seen that No. 1 was probably a case of spurious menstruation ; that in No. 2 there may have been more or less marked laryngitis, giving rise to the hoarseness complained of ; and in No. 3 there was cirrhosis of the liver, probably giving rise to more or less congestion of the veins all over the body. In the other three cases no cause for the bleeding could be detected.

Submucous hemorrhages of the larynx, either resulting from marked active congestion or inflammation, or from overuse of the voice or from severe coughing, are not very uncommon pathological conditions, numerous cases of these having been reported ; but as seen by. the few cases which I have been able to find active bleeding unaccompanied by destructive disease of the larynx is of very rare occurrence. I desire to put on record the following case, which I believe is of interest because of its rarity.

Mr. D., aged thirty-six years, has been a healthy man all his life. He was somewhat addicted to alcohol, though never excessively so.

He came to me first on August 10, 1899, spitting up a small quantity of bright-red blood every few minutes. There was no cough accompanying the expectoration. He simply, with a very slight hawk, was able to eject the blood or bloody mucus from his mouth. On the morning of his visit, while chewing a toothpick (to which habit he was more or less inclined) a piece lodged in his throat, causing considerable though temporary cough. An hour or so later he began to split blood. Naturally his mind turned with dread to the thought of consumption, and he came chiefly to find out whether he was a sufferer from that disease. His lungs, which were examined by Dr. H. C. Wood, Jr., were found to be in perfect condition. Besides, there was no loss of weight, no chronic cough, nor any other reason outside of the bloody expectoration to suspect tubercular disease. Local examination showed the nose to be normal, except for a small septal ridge on the left side, and no blood could be detected by anterior rhinoscopy. The vault of the pharynx, however, was seen to be flecked with small blood clots, likewise the posterior pharyngeal wall and the lingual tonsil, the latter being somewhat enlarged. With the laryngoscope the arytenoid cartilages and the intervening fold of mucous membrane were seen to be red and covered with fresh blood, which was evidently coming from the larynx. The vocal cords and anterior wall of the trachea were also covered with blood. The actual bleeding spot could not be determined. Supposing at that time the case to be one of traumatism, caused by the lodgement of a portion of the toothpick, I gave a favorable prognosis, and ordered potassium bromide and fluid extract of ergot. On the following afternoon, when I saw him, the bleeding had stopped, and there was no sign of blood in either pharynx or larynx, except a small red point at the anterior end of the left vocal cord, possibly the source of the bleeding. Careful re-examination of his lungs and heart gave negative results, though he complained somewhat of palpitation. I ordered tincture of aconite in small doses for a while, and did not see him again until February 13, 1901. He then came back to me with practically the same symptoms as at his previous visit, except that at this time the bleeding had started from apparently no cause. He had given up the habit of chewing toothpicks, and was in perfect health up to the time when the desire to expectorate showed the hemorrhage to have started. He had not overtaxed his voice, nor had he exerted himself in any manner sufficiently to act as an exciting cause of the bleeding. During the summer of 1900, while I was out of town, he had had another attack of bleeding, which had ceased spontaneously. The patient during the last two years had not lost weight; had not suffered from cough; but had had occasional attacks of dyspepsia. On examination the nasal fossæ were found to be free from blood, likewise the vault of the choanæ. No blood clot or other sign of bleeding could be detected in either the fauces or oropharynx, but a number of clots were seen on the epiglottis and the vocal cords were covered with bright red blood. A thin streak of blood was noticed running down the anterior wall of the trachea.

I consulted with Dr. Freeman, who believed that the hemorrhage came from the larynx, and almost surely from a spot just below the anterior commissure. He called my attention to the condition of marked dilatation of all the veins of the gums, of the pharynx, and of the larynx. The bleeding was temporarily controlled by local applica-

tions of suprarenal extract, though it returned again in very slight quantity three or four hours later. Another careful examination by Dr. H. C. Wood, Jr., to detect any possible disease in the other organs of his body gave negative results, except for a marked oxaluria. For this latter condition he was put on nitrohydrochloric acid, and the oxalates rapidly disappeared from his urine. When I saw him on February 22d, nine days after the hemorrhage, the engorgement of the veins of the mucous membranes of his throat and larynx had considerably diminished, and he had had no bleeding since the day of his visit.

In looking over this case for any assignable cause for the hemorrhage I can find nothing at all which seems to me conclusive. There was undoubtedly an abnormal condition of the bloodvessels—" a predisposing cause;" but in this last attack, as also in the one occurring when I was out of town, no direct cause could be detected. Also, it seems hard to believe that the dilatation of the veins was due to his condition of oxaluria, though the coincident decrease in the size of the vessels following decrease in the amount of oxalates in the urine was somewhat suggestive. In such cases as that reported by Lubet-Barbon, No. 3, where there exists a marked pathological condition like cirrhosis of the liver, giving rise to dilatation of the veins all over the body, it is easily conceivable how some slight unappreciable trauma may cause rupture of the veins; but in such a case as reported by Straight, where from apparently no cause whatsoever a man began to expectorate blood, which in spite of all treatment kept up until death finally intervened, a direct result of hemorrhage, we as diagnosticians must acknowledge defeat.

Of course, it is not inconceivable that in the case from my own experience there may exist some slight tubercular focus in the lung; unprogressive but sufficiently active to cause the rupture of a small bloodvessel; but the probability of such a condition seems for the following reasons infinite in its minuteness:

1. No recognizable symptoms of tubercular disease could be detected.

2. The blood, though apparent in the trachea, was evidently running downward and not upward, existing as a small narrow streak on its anterior wall.

3. The blood was expectorated easily, without cough.

4. The point of bleeding was thought to have been found just below the anterior commissure in the last attack, and on the anterior end of the left vocal cord at his first visit.

5. The temporary cessation of bleeding following the local application of suprarenal.

Of course, if at a later date tubercular disease develops in this case it would point very strongly toward an explainable etiology, though I cannot admit that it would be a positive indication of present tubercular trouble.

BLASTOMYCETIC DERMATITIS OF THE GLUTEAL REGION.[1]

By Frederick G. Harris, M.D.,

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THE history of this case is somewhat incomplete on account of the patient's mental condition, but so far as obtainable it is as follows:

Family History. The patient is a woman, aged seventy-eight years. Both her father and husband died from unknown causes. Her mother died of phthisis. She has had nine children; one daughter has phthisis, one son is living and well, one child died in infancy, two children died of yellow fever, and four are dead of causes unknown to the patient.

Past History. The patient was born in Germany; lived in New Orleans for forty years, during which time she had yellow fever. She never had any other illnesses, denies venereal infection, and there are no stigmata present. She has lived in Chicago for the past ten years.

Present History. Patient's present trouble commenced nearly four years ago, when she noticed a pimple on her left hip, which became a roughened area of intense itching, and later, on account of scratching, became apparently denuded of epithelium. The growth gradually increased in size and the itching persisted, but of much less intensity.

She was admitted to the Cook County Hospital as a case of syphilitic ulcer. A piece of the growth was excised and on microscopical examination a diagnosis of epithelioma was made and the patient transferred to the surgical service of Dr. Charles Davison, who has kindly permitted me to report the case.

The growth is on the upper posterior part of the left gluteal region; it is oval in outline, measuring 11 cm. long by about 6 cm. wide. The entire growth is movable on the underlying tissues. The border is quite hard, elevated about 8 mm., and in places the growth can be felt extending out into the surrounding skin. From the inner side of the border papillomatous growths overhang the floor; they are of various sizes, the largest measuring 2 cm. long. Most of these villous-like projections bear secondary and tertiary growths of a smaller size, the whole being covered with epithelium, giving them a bluish-white color similar to venereal warts. At no point on the border is there an area of ulceration indicating an extension of the process (Fig. 1).

The floor is covered with small fungoid epithelial growths similar to those projecting inward from the border. These papillæ vary in size from a small elevation to 0.5 cm. in height. Here and there among these elevations are darker red areas of ulceration, the whole floor being more or less covered with a hemorrhagic exudate. Extending in a diagonal direction nearly across the growth is a band of uninvolved skin about 2 cm. wide.

There are no secondary growths near, or, in fact, on any part of the body; but on the bridge of the nose is a hard, non-ulcerated, sessile tumor about the size of a hazel-nut. It is freely movable on the bone,

[1] Read before the Chicago Pathological Society.

but the skin is closely attached to it. On the surface are seen several dilated bloodvessels. This little tumor is painless. It has been there for the past twenty years, and the patient thinks it is due to the irritation of a pair of brass spectacles. It bears no resemblance whatever to the growth on the hip, and microscopical examination shows it to be an endothelioma.

The patient complains only of the itching, which is much less intense than when the growth started, but which at times interferes with walking; there has been no actual pain at any time. The neighboring lymph glands are but slightly enlarged.

Pieces of the hip lesion were fixed in 4 per cent. aqueous formalin, dehydrated in alcohol, cleared in benzole and cedarwood oil, embedded in paraffin, and stained by various methods. The best results were

FIG. 1.

obtained with eosin and polychrome methylene-blue, but hæmatoxylin, followed by Van Gieson's stain, gave good results, as did also Weigert's elastic-tissue stain. Sections stained for tubercle bacilli were negative, as were those stained by Gram's method.

Microscopical Appearance. Some distance outside of the growth the skin is normal, but on approaching the affected area the interpapillary processes of the rete mucosum are seen to extend deeper into the corium, and instead of being regular in form they often have knob-like projections from their sides, as if they were budding, and at their lower extremity they often bifurcate to enclose a mass of corium. This irregularity increases the nearer we approach the growth. At the edge of the growth we see the papillomatous outgrowths extending over the floor. They are seen to be formed by an extension of the

corium, covered on both surfaces with epithelium, which extends into the interior in irregular projections.

In this core, so to speak, are irregular isolated masses of epithelium, many of which are hollow and contain corium infiltrated with round and plasma cells and leucocytes. Occasionally in these islands of epithelium we find the miliary abscesses which are so characteristic of this disease.

The floor of the growth shows villous projections similar to those described as growing inward from the border. From the surface of the floor there is a marked hyperplasia of the rete mucosum, which dips down into the corium in coral-like projections, branching in different directions or subdividing to enclose masses of the corium. Sometimes the cells in the centre of these epithelial down-growths have

FIG. 2.
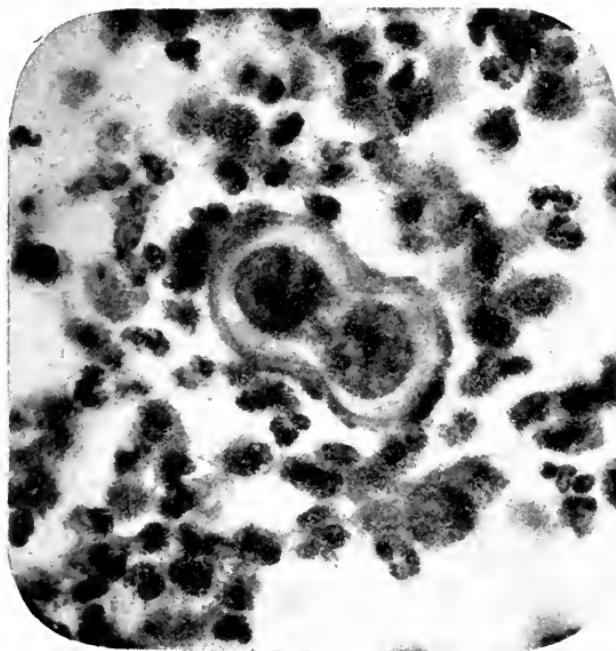
Budding form of blastomycetic organism. (BAUSCH and LOMB, $1/12$.)

become cornified and taken on a concentric arrangement simulating the pearls of epithelioma.

In other places are seen miliary abscesses, composed mostly of collections of polynuclear leucocytes, desquamated epithelial cells, more or less granular material, an occasional giant cell, and the specific organism. These abscesses are surrounded by flattened epithelial cells, the prickles of the outer layers being well preserved. The abscesses are most numerous deep in the corium, where the organisms and giant cells are also more common. The giant cells are of the tuberculous type; they are found more abundantly in the areas of round-cell infiltration which are present here and there, and especially where a miliary abscess has ruptured; once in a while a giant cell is seen containing the blastomycetic organism (Fig. 2).

The organism is the typical double-contoured circular or oval body
having a mass of deeply staining, granular protoplasm, which is usu-
ally eccentrically placed, often containing one or more vacuoles.   The
organisms vary much in size and are found in groups of two or more,
usually in the different stages of budding.   They are not so numerous
in this case as in some of those previously reported.   They show a
tendency to occur in the periphery of the abscesses or free in the
corium where an abscess has ruptured, and are often surrounded by a
granular material which takes the eosin stain.   I have been unable to
find any organisms free in the rete or in the necrotic material covering
the ulcerated areas.

The corium is well preserved and very vascular; the entire tissue is
more or less œdematous and shows a marked infiltration with leuco-
cytes, which while most numerous in the miliary abscesses are also seen
in great numbers between the cells of the epithelium, seemingly work-
ing their way toward the surface.   There are vast numbers of poly-
nuclear eosinophiles and plasma cells in the corium; mast cells are
also not uncommon.

The appendages of the skin, hair follicles, and glands have entirely
disappeared.

Unfortunately there were no cultures made from this case.

The treatment consisted of complete excision of the affected area and
the sliding of cutaneous flaps to cover the defect.   With the exception
of some sloughing of the flaps and the development of a pleurisy with
effusion, the patient has made a satisfactory recovery, and there is no
evidence of recurrence.

SUBINVOLUTION OF THE UTERUS: THREE SUGGESTIVE CASES.

By L. W. ATLEE, M.D.,
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SOME apology may seem to be due for a paper on so familiar a subject,
but one will search and find but few articles in medical journals and
society reports devoted to gynecological subjects which are not of a
surgical nature; very few, indeed, on the therapeutic use of medicines.
Gynecology, it is true, is largely surgical, and without surgery would
be relegated to its position of nearly half a century ago.   " That the
pursuit and report of surgical procedures are in many ways more satis-
factory than the investigations of the virtues of medical remedies—more
satisfactory because of the brilliancy of execution, the certainty of
results, and a higher remuneration—we all appreciate."   A satirist
has defined therapeutics to be the art of introducing a medicine of
which we know little into a body of which we know still less.   *Ars
medica tota est in observationibus.*   " One of the most elementary
requirements of science is the power of distinguishing between real and
merely apparent causes.   .   .   .   It is indeed a power most rare among
therapeutists as well as most difficult to exercise, so strong is the ten-

dency of human nature to take to itself the credit of all the good that arises under the operations of natural laws.

The tendency of the modern text-books to omit to describe old and well-established successful methods of treatment simply because they are not new, and thus to limit themselves to the newest methods only, cannot but result to the coming medical man in a certain loss of his usefulness and increase of his power to do harm. Library gynecologists may be all very well, yet " there are many who are getting their first personal experience in this new decade who readily accept their teachings as indisputable doctrine, promulgated *ex cathedra* for their guidance. Indeed, there is such a disposition in these days of startling innovation to fall in with the latest drift of thought without sufficient test of its claims that not infrequently valuable methods of practice are too easily allowed to be discarded for the sake of the new love, which often proves to be fickle and unreliable."

This neglect of the old methods is brought about apparently not so much by their having proved themselves valueless, but by the fear of the writers that they themselves may not be considered quite " up to date " and *fin de siècle*, the result being that the old methods are entirely ignored or are relegated to such an inconspicuous place that they appear only as secondary to the latest and practically untried forms of treatment. The latter are freely quoted from, and especially the names of Germans who hold the most advanced views and are swayed by the least surgical morals.

In the words of Senn, " The *furor operativous* has been carried too far in the present time in this department of surgery as well as in nearly all others. . . . A remunerative fee or the fear that the patient will get into the hands of his competitors often deadens his sense of moral obligation toward his patient when he renders his final judgment concerning the propriety of an operation."[1]

By the term subinvolution we mean the condition which results from imperfect involution of the uterus after labor, abortion, or miscarriage. This form of hypertrophy of the womb, Courty tells us, " is pathological only because of its permanence, but physiological in its origin." The importance of this condition and its power to produce harm cannot be overestimated, for Thomas, of New York, declares : " Arrest of involution of the puerperal uterus is an occurrence of very great frequency. It constitutes the chief cause of all chronic uterine disorders, and for this reason its importance cannot be overestimated."

Mrs. C., aged twenty-three years, a well-nourished woman, rather anæmic ; first seen nine weeks after the birth of first child. Had been attended in labor by a physician. I learned from the nurse, who had been recalled again to take care of her while confined in bed, that

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[1] Pathology and Treatment of Tumors.

immediately after the child was expelled the woman had an attack of eclampsia, and after this she did not regain consciousness until the following day. In reply to my questions as to what the attending physician had done at the onset of the convulsion, she said, "He jumped up and ran off to the nearest drug-store to telephone for assistance," and later the consulting physician had removed the placenta; there had been but little loss of blood. She suckled the child. The woman had got up on the eighth day and attended to her housework, but feeling weak and easily fatigued. There was a constant sacral and hypogastric uneasiness amounting in the evening to pain. She also had a profuse leucorrhœa, the discharge at times being streaked with blood.

Some three days before this visit she found herself unable to extend her legs without causing severe pain in the iliac region. She then took to her bed. There was a slight rise of temperature; the tongue was clear and the appetite excellent. Lying on her back she could extend her legs without pain; it was only on trying to stand erect that the pain was brought on. Examination revealed the fundus uteri slightly above the symphysis pubis and tender on pressure from the abdominal walls; there was no tenderness elicited by pressure at the sides of the uterus in the ovarian and tubal regions. Vaginal touch showed the external os patulous, and pressure on the body of the uterus at all points attainable through the vagina by the finger showed tenderness.

Having thus a perfectly plain case of subinvolution of the womb following labor and accompanied by endometritis, the following treatment was resorted to, which has given reason to be well satisfied with its results in many other cases of this nature:

First, to produce daily evacuation of the bowels she was given a drachm of sulphate of magnesia half an hour before breakfast. It has been found best to give this to these cases in a solution with aqua menthæ piperitæ, 1 drachm to half an ounce, to be taken in a half-glassful of water. If told to take a teaspoonful of salts it does not have the same mental effect, which no one of experience despises; also 100 one-grain Bonjean's ergotin pills were ordered, one of which was to be taken an hour after meals. The only topical application used was one gallon of water at 110° F., twice a day, in the dorsal position, with the hips well elevated. She was told to eat plenty of good, wholesome food and remain in bed as long as it was painful to stand erect.

Two weeks after this she reported at my office, the pain and soreness having disappeared; she had been out of bed for five days. The first ten days after getting up the leucorrhœal discharge had recommenced, but had now entirely ceased. Examination per vaginam showed the patulous condition of the os to have passed away; the uterus was still enlarged, but not tender on pressure. She was advised to continue the ergotin and use one douche a day, and a ferruginous tonic was ordered in addition (ferri et quiniæ citratis cum strychniæ, gr. 10, in vini xerici, ½ ounce, a. c., t. i. d.). When seen a month

after this visit she was perfectly well. On this occasion the child needed the attention.

Mrs. H., aged thirty-two years, a large, robust woman, weighing some 200 pounds, came complaining of excessive menstrual flow for the past week and of leucorrhœa previously. During part of this time she had been travelling from her home in Wisconsin. About five weeks ago she had an abortion performed by her attending physician at her home. She had lost considerable blood at this time. She knew nothing as to whether the whole contents of the uterus had been expelled or not. Her general health was excellent, tongue clear, and appetite good, but she complained of a feeling of fulness and sense of weight in the pelvis, with slight pain at times in the left ovarian region. Examination per vaginam with the finger showed the os externum very patulous, large, and soft, and directed toward the hollow of the sacrum. The uterus was as large as the third month of pregnancy and anteverted, the fundus being tender on pressure in the anterior vaginal fornix, where it was easily delineated.

This woman did not want to be laid up; she was on a pleasure tour and desired to leave immediately for the New Jersey coast to enjoy the sea air and baths. What she desired was some form of treatment that would permit of her doing this. She was advised to keep on her back as much as possible, to use the hot vaginal douches once a day, and internally to begin with a single dose of two grains of ergotin, then every four hours one grain was to be taken until the bleeding ceased; then she was to finish her box of pills (100), taking one grain one hour after each meal. The bowels were to be freely moved daily by saline laxatives.

A letter was received four weeks after her visit reporting her as feeling perfectly well; all the pelvic symptoms had disappeared; the leucorrhœa ceased after taking the ergotin and douches for two weeks. She had continued the use of both until the date of the letter and desired to know if a continuance of the treatment was necessary. She was instructed to wait until after the next menses and report again as to the amount and continuance, also should the leucorrhœa recommence afterward. In due time she wrote that the menses had been entirely normal and no discharge followed.

Mrs. Fitz——, aged thirty-eight years, a large, stout woman who had borne twelve children. She sent her husband for me owing to profuse menstrual flow, which had caused her great anxiety. Nine weeks previously she had been confined with a full-term, stillborn child, which she said was perfect in every way. During the first stage of labor she had lost a good deal of blood, and her accoucheur had told her the "after-birth was first." The labor otherwise was natural and short. She felt well enough until she got up and resumed her household duties, when she began to have a profuse leucorrhœal discharge, a feeling of dragging in the pelvis, frequent and painful micturition during the day, and a general tired feeling and disinclination to move. There was no sacral pain or headache, but she was costive, needing laxatives to have any movement from the bowels. She was anæmic. The tongue was clear and she had no fever. Digital examination per vaginam showed an old, extensive perineal rupture; the uterus was low down, close to what should have been the perineum; it was large

and soft and slightly tender when palpated between the vaginal finger and abdominal hand. The os was open, soft, and patulous, the whole vaginal portion being enlarged and elongated.

She was advised to remain in bed until the bleeding stopped and given one grain of ergotin every four hours until it did so. After this she was to use one grain of ergotin three times a day for one month. After the menstrual period was over she was to use twice a day the hot vaginal douche also until the next menstrual period, and then after the period to report her condition. A large rubber ring-pessary was introduced, which kept the uterus in fairly good position. She came to the office at the time specified and said she was very comfortable; all the symptoms had been relieved and the menstrual period just past had been quite normal. The uterus was much reduced in size and no longer tender on pressure, and the os was well closed; the leucorrhœa had ceased for some time.

To Sir James Y. Simpson we owe the first scientific explanation of the condition known now as subinvolution, as previous to his paper published in the *Edinburgh Monthly Journal of Medical Science* for August, 1852, the enlarged uterus had been regarded as a form of metritis and its treatment had been most unsatisfactory. This article was embodied in the posthumous volume of his writings. In it he tells us: " The enormous increase which occurs in the parietes of the uterus during the nine months of pregnancy has long attracted the attention of professional observers. It is a kind of physiological hypertrophy, unequalled either in regard to its magnitude or its rapidity in any other organ in the adult human body; for during the forty weeks of uterogestation the uterus enlarges from nearly three inches in length and one and three-quarters inches in breadth, to twelve or fifteen inches in length and nine or ten inches in breadth. It increases from about two ounces in weight to twenty-five or thirty ounces. The cavity of the uterus before impregnation is less than one cubic inch, while at the full term of pregnancy it is extended to above 400 cubic inches; and the surface of the organ increases from about five or six square inches to nearly 350 square inches. Before impregnation the cavity of the uterus would not hold above a drachm or two of fluid; at the ninth month of uterogestation its contents usually weigh from 120 to 150 ounces.

" The rapidity, however, with which the uterus diminishes in size after delivery is, perhaps, still more marvellous than the rapidity with which it increases in size after impregnation. While the human uterus takes forty weeks to attain the dimensions pertaining to the fully developed state of pregnancy, it requires, on the contrary, from four to eight weeks only to decrease from the extreme size of the organ peculiar to pregnancy down to the small size peculiar to the same organ in its unimpregnated condition.

" But in the vital mechanism of the involution or reduction of the uterus after delivery various pathological derangements are liable

from time to time to occur. This, like every other process in the animal economy, is apt, for example, to fail either in the way of defect or excess. Some years ago I endeavored to point out to my professional brethren that occasionally, as one of the derangements in this mechanism of involution, the uterus is morbidly slow in regaining its original dimensions; its involution becomes impeded or arrested, and the organ is in consequence liable to be found, weeks or even months after parturition, still so large and unreduced as at first to be readily mistaken for a tumor of the uterus or ovary. I described this peculiar condition of the puerperal uterus under the name of ' morbid permanence of the state of puerperal hypertrophy.' . . . Retarded involution or retarded reduction of the uterus after delivery is not infrequent in its less marked degrees, especially when inflammatory or febrile action supervenes and interferes with the phenomena of the puerperal state. It is often, for example, observable both during life and after death in women who are the subjects of puerperal fever, pelvic cellulitis, and phlegmasia dolens. In lesser though sufficiently marked degrees it often persists for many long months, or even years, after parturition, particularly when combined, as I have frequently found it, with acute flexion or retroflexion of the fundus uteri or with the state of prolapsus." In the treatment of these cases he used " leeches and antiphlogistic measures."

In 1856 West published his *Lectures on the Diseases of Women,* and in Chapter VI., entitled " Uterine Disease from Interrupted Puerperal Changes," he says: " One result of inflammation succeeding to miscarriage or delivery is to check that process of involution by which the womb ought to be restored in a few weeks to the size and condition which it presented before pregnancy began. . . . The increased size of the uterus, too, is not due simply to its natural contractions being arrested, nor to the unnatural afflux of blood toward it, nor to the effusion of the products of inflammation into its substance, though possibly all of these causes may in various degrees contribute to it, but is in a great measure owing to the mere suppression of those changes which ought to occur after delivery, . . . and the organ remains, long after all active mischief has passed away, increased in size and at the same time composed of a tissue inapt for all the physiological processes of conception, pregnancy, and childbearing. . . . After inflammation has passed away the womb is left in such a condition as to render the repair of the damaged organ both unlikely to occur and slow to be accomplished, and it is peculiarly liable to be aggravated during the fluctuations of circulation and alternations of activity and repose to which the female sexual system is liable . . . A degree of inflammation far short of what is requisite to endanger life or to occasion much suffering may yet interpose a great obstacle to the

complete involution of the womb. . . . The great importance of
this condition is due less to the symptoms to which it gives rise, so long
as it remains uncomplicated, than to the circumstance that complica-
tions of some kind or other are very apt to occur; that the heavy
uterus is very likely to become prolapsed, or the enlarged uterus to
become the seat of permanent congestion or to be attacked by chronic
inflammation. A sense of weight in the pelvis, more or less bearing
down, and a disposition to excessive or over-frequent menstruation are,
however, seldom absent when any considerable uterine enlargement
exists, and in general the size of the womb and the severity of the
symptoms are in direct proportion to each other."

He gives the history and condition of an illustrative case that is so
typical of the condition under discussion and so frequently encoun-
tered by the general practitioner that we will transcribe it:

A woman, aged thirty-one years, who had been married twelve years
and had given birth to five children at term and had miscarried three
times. Her last abortion occurred at the third month, six weeks
before her admission into the hospital. Since this abortion she had
suffered from shooting pains at the lower part of the back and in the
abdomen, from bearing-down pain at every effort at defecation, and
from a constant sanguineous discharge by which she had been much
exhausted. The medical men under whose care she had been told her
that she had a tumor of the womb. On examination the uterus was
found low down, completely retroverted, the os uteri being directed
forward and only a short distance from the vulva. Almost immedi-
ately behind the os the uterus swelled out into a globular tumor of the
size of a small apple, elastic to the touch. The canal of the cervix
was open so as to admit the finger without difficulty. On introducing
the uterine sound it passed, with the concavity turned backward, for
a distance of five and three-quarter inches, and on turning round the
tumor previously distinguished entirely disappeared. The patient was
kept quiet in bed, was allowed a little wine and meat diet, and the
hemorrhage ceased and the canal of the cervix contracted under the
use of the ergot of rye, though no sensible uterine action was excited
by the remedy.

This case was greatly benefited by the rest, tonics, and ergot, but
the retroversion still existed when she was examined three months later,
and the uterus was still enlarged; the treatment was continued and
cold douches given. She was seen again three years later, during which
time she had miscarried several times at an early period of pregnancy.
"Her uterus was still retroverted, and the abortions were probably
due to the organ having been turned down by adhesions in this unnat-
ural position. It had, however, greatly diminished in size and was
now little, if at all, larger than the healthy womb."

The most common causes for subinvolution are too early rising after
childbirth or miscarriage, lacerations of the cervix or perineum, and
septic infection resulting in the various inflammations of the pelvic
contents; and to these may also be added the displacements of the

uterus due to the laxity of the supporting structures from the same condition of subinvolution in them. This condition of displacement acts more as a secondary cause, keeping up the already existing enlargement of the uterus.

Courty tells us in his splendid work on *Diseases of the Uterus* that " These sufferers attribute the unusual sensations first experienced to the weakness following labor, and wait patiently for them to disappear, but several months pass without bringing any change in their state; they commence to be astonished and disappointed not to find themselves relieved. After the child is weaned, if they had been able to nurse the child (which is unusual), they find their menses do not appear regularly or are profuse and painful. A leucorrhœa, more or less abundant, is often added to these symptoms. In the end these sufferers find themselves in a bad state of health, hard to endure. Tonics and sedatives give them some relief and make them hopeful of being cured, but the relief is incomplete. Not only does it require time to bring about a cure, but it also requires a special treatment."

In the great majority of cases of subinvolution of the uterus the patients will come to the practitioner complaining of the symptoms of the endometritis accompanying the condition and perhaps causative of it. She has backache, pelvic pains, dragging sensations about the loins, " bearing-down " pains, leucorrhœa, menstrual disorder tending to excessive flow, throbbing sensations about the uterus, general feeling of despondency, malaise, and weakness; irritability about the bladder and rectum. All these rational signs pointing to the uterus as the probable delinquent organ, a physical exploration is made and furnishes the following results: The uterus is usually discovered to be in the position of descent, retroflexion, or anteflexion; it is voluminous, tender to the touch, and evidently engorged with blood; from the cervical canal a leucorrhœal matter flows; the probe carried to the fundus finds it tender and creates the flow of a little blood; the cervix is large, soft, and patulous, and in the late stages in a state of cystic degeneration.

Of the treatment of this condition Thomas writes: " I do not hesitate to declare that he who fully masters it and thoroughly appreciates its frequency and influence will possess a key to the management of numerous cases which would in vain be sought for elsewhere."

The general treatment of these cases is of the utmost importance as to such means as are used for the production of red blood being instituted; iron and tonics are invaluable combined with a liberal diet with plenty of fresh meats, easily digested; but to digest and assimilate " beef and iron " much fresh air is necessary, and this is not easily attainable by those to whom movement is irksome. We are so often given such very impracticable details of treatment for people of the less easy classes—and these make up the great mass of the ordinary

medical man's clientèle (to whom these few remarks are addressed), for his patients cannot go off on delightful jaunts like

> " Mrs. Gill who is very ill,
> And nothing will relieve her
> But to see the Tuileries
> And waddle through the Louvre !''

The people who must stay at home and care for the children and perform the usual housewifely duties, and who are not sick enough to be in bed, what are they to do ? or have they no right to be sick ? At best we can advise these poorer sufferers to go out at least once a day with as little fatigue as they can to themselves. I have found the time-honored prescription of drinking three glasses of warm, fresh milk every day, and, as advised by Bulkley, one hour before meals, to be a great help in restoring lost tone ; also, these people can make use of the warm salt bath, which has been effective to this end in my observations.

Simpson advised counter-irritation to the abdomen and sacrum ; for this he used croton oil, antimonial ointment, fly-blisters, and tincture of iodine. This was supposed to help in the absorption of the enlarged uterus, and at the same time mercurial ointment, or ointment of iodide of lead, or of bromide of potassium, and such like remedies, were applied to the vaginal portion of the uterus. Internally he used iodide or bromide of potassium for their absorptive effects, and the latter also for its calmative effect on the generative organs. To the above remedies Courty says he has added and used with advantage ergot, electricity, stimulating frictions, and sea-bathing.

A. Reeves Jackson, in vol. v. of the *Gynecological Transactions*, has a most interesting and instructive paper on the use of " Uterine Massage " in enlargement of the uterus, and gives the history of several cases in which it was entirely successful after the usual treatment had failed. He describes in his article the cases suitable for this treatment and gives the particular details of the manipulations used.

Of the internal remedies used for the treatment of subinvolution ergot is by all acknowledged as the most important and successful. Bartholow tells us " the indication for the use of ergot in menorrhagia is the existence of the large, spongy uterus—the condition of things which depends on subinvolution of the womb." In vol. xii. of the *Gynecological Transactions*, Dr. Palmer, of Cincinnati, in a paper on " The Therapeutic Value of Some Medicines in the Treatment of Hemorrhagic Conditions of the Uterus," says of ergot : " It is a remedial agent which proves curative in some cases, benefits many, but may aggravate a few. The well-proven physiological effect in stimulating contractions of the involuntary, unstriped muscular fibres, wherever found, makes this drug singularly adapted to conditions of the uterus with developed but relaxed muscular fibres, with dilated and engorged bloodvessels. Hence such pathological states of the uterus as chronic

hyperæmia, of an active or passive kind, chronic metritis in its first stage, subinvolution—attended as they are by increased menstrual flux or by hemorrhage—are controlled by ergot. The more soft, flabby, relaxed, and succulent with blood the uterus is the better the good effects of ergot will be displayed." Thomas, of New York, tells us: "During the state of enlargement—that is, before contraction of the exuberant tissue has taken place—ergot, kept up for a considerable time, produces good results. By its power of exciting contraction of the uterine tissue it diminishes hyperæmia and lessens the bulk of the uterus." Before leaving this subject we will quote, as a caution to those who may use ergot in the future, and perhaps also for the benefit of those who have not hitherto found ergot to answer their expectations in these cases, the following from Bartholow: "The numerous and diverse views which have been expressed may be in fact explained by the character of the preparations. There can be no doubt that the active constituents are unstable, and hence the pharmaceutical products vary, not only in the degree, but decidedly in the character of their actions. In Kohler's investigations, in which he compared the ergotin of Wiggers and Bonjean, there were very wide differences between them. The ergotin of Bonjean—an aqueous extract—excites the vasomotor centre in the medulla and the cardiac inhibitory centre, and very large doses paralyze the heart, the muscular tissue losing its excitability to galvanism. Wigger's ergotin has no effect on the vascular apparatus. In these experiments of Kohler the power of ergot to increase the blood-pressure is an important point. The attentive reader will observe that in these experiments the heart was paralyzed and the irritability of its muscular tissue destroyed. Wigger's ergotin causes cramps of the intestines and violent inflammation of the gastrointestinal mucous membrane—effects which never result from Bonjean's. Both kinds of ergotin lower the temperature and both retard the respiration. Bonjean's ergotin diminishes the irritability of the peripheral motor nerves and Wigger's increases it. Both lessen the irritability of the sensory nerves. Kohler concludes that when it is desired to slow the heart, contract the vessels, diminish reflex actions, and lessen temperature the ergotin of Bonjean should be used."

Subinvolution can be benefited by the frequent application of the properly selected electric current; but this is an expensive method of treatment, requiring frequent visits to the practitioner's office and also necessitating more or less special knowledge and the possession of expensive apparatus.

That the repairing of a torn cervix or the suturing of a ruptured perineum will assist in the removal of this condition of defective involution is well established; however, we are now only having reference to such cases as refuse to consent to be "laid up" for the long time made imperative by these procedures.

What shall we do, then, for these women who come to us complaining of pelvic dragging, backache, leucorrhœa, and most of them also anæmic, with poorly performed digestion and defective chylopoëtic action generally?

First of all, let us sustain this heavy uterus which we find in the first stage of prolapsus or in the perineum, for the uterus has descended by its own weight and from the laxity of the usual supports, and the displaced organ is thus kept in a state of engorgement from its circulation being impeded by the abnormal position.   In my experience this support is well given by the proper adjustment of a soft-rubber ring-pessary, and I have received the most enthusiastic acknowledgments of the patient for the comfort thus given her even before she left my consulting-room.[1]

In these cases constipation is best relieved and the congested pelvic viscera benefited by sufficiently large doses of sulphate of magnesia to produce one or two watery stools each day.

Emmet tells us " that a copious flow over the vaginal surface of water varying in temperature from 100° to 110° F. is most appropriate for all cases in which congestion exists." " The injections," says he, " can be better given to the patient after she is undressed for the night and in bed.   She should be placed near the edge of the bed, with the hips elevated as much as possible by the bedpan and a small pillow under her back, the lower limbs being flexed.   Her body must be covered to protect her from cold and her position made perfectly comfortable; whenever the bed is a soft one, for the purpose of keeping the hips elevated a broad board should be placed under the bed-pan to prevent it from sinking into the bed from the weight of the patient.   The vessel of hot water is placed in a chair by the bedside. The water must be thrown in very carefully at first until the vagina has become distended."   Lastly, and not the least important, the patient should be advised to support all the heavier skirts from the shoulders; and should the abdominal walls be extremely lax, as we so frequently find in multipara who have borne a large number of offspring in rapid succession, a properly fitting abdominal supporter will give relief.

" But the time has now surely come when the surgeon, whose knife is ever warm from contact with living tissue and whose pen is ever busy announcing and defending the claims of his work, might give a little time to those who have other life-saving means to proclaim; at least, while others are honestly discussing the value of certain surgical procedures, the busy operator may, while he pauses to wipe the perspiration from his own forehead, look back and join in the efforts to solve the problem of the real and apparent value of his doings."

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[1] Thomas tells of a medical acquaintance of his who declared he never knew a case in which pessaries did good. This explained itself to Thomas later, when he discovered that his friend always introduced the pessary *upsidedown*.

REVIEWS.

The Technique of Surgical Gynecology. By Augustin H. Goelet, M.D., Professor of Gynecology in the New York School of Clinical Medicine; Consulting Professor of Gynecological Electro-therapeutics, International Correspondence Schools, Scranton, Pa. New York: International Journal of Surgery Company.

An act and the purpose for which it is performed are two very different things, and criticism of the one may not be at all applicable to the other. Thus in the making of books it is one thing to write with a bad purpose and another to produce a good book while so doing.

In the present volume the author states in his preface that "the purpose of this work is to describe with sufficient fulness and clearness of detail the operative technique of the more common gynecological operations, that it may serve as a guide to the operator who is not thoroughly familiar with them. Unfortunately works on gynecology are lacking on this point, and many men are obliged to operate without either having assisted or witnessed them at close range." The aim of the author, therefore, is to create a short cut in gynecology, or, in other words, to substitute theoretical knowledge in place of the practical experience only to be gained by standing day after day, year in and year out, on the opposite side of the table from a man skilled in this particular line of work, who, it is to be remembered, only reached his position after years of the same drudgery. It is an alluring prospect, it flatters the vanity, but, like the mirage of the desert, it is a deception. Unfortunately useless sacrifice of human life may be the price paid by the would-be operator in learning that there is a vast difference between theoretical and practical surgery.

Of course, it is true that there are occasions when a woman far from skilled surgical aid may be in a condition demanding immediate operation, but such cases are rare, and if confronted by them it will be better that the general practitioner, unskilled in major surgical technique and without the least idea of surgical cleanliness, shall hold his hand. No book-training, no matter how closely he has applied himself to its mastery, will ever justify a man in undertaking major surgery unless the alternative of non-interference be certain death.

So much for our ideas regarding the author's aim in writing the book. Now as to the book itself. It is well written and is well worth reading. The chapters on the preparation of the patient for operation and the after-care are especially good, and the importance of surgical cleanliness is everywhere insisted upon. Conservatism in operating is also strongly emphasized, and while some of the advice given on this phase of the subject seems a little extreme there is no doubt that there is still room for earnest work along this line.

Unfortunately, however, there are some things in the book which seem out of keeping with its general excellence of tone. Much to be deplored is the statement when speaking of amputation of the cervix that the complete form of operation is " done for carcinoma which is confined to the cervix." This seems, at least tacitly, to give consent to this method of treatment of very early cases of cancer, and will certainly be considered an inexcusable statement by the majority of operators. Remembering the class of readers for whom the author is confessedly writing, it is certainly the more reprehensible in that it may, by belittling the dangerous nature of the pathological condition, deprive patients of the chance, slight though it may be, which a radical operation offers. It seems strange that in speaking of the repair of lacerations of the perineum there is no mention made of Emmet's operation, and also that so much stress is laid upon the use of silver wire in repair of the cervix. Certainly the combined experience of the great majority of operators shows that the above-mentioned operation is by far the best for the ordinary type of case, and that the use of the latter may be well discontinued in favor of other forms of suture material.   W. R. N.

THE HISTORY OF MEDICINE IN THE UNITED STATES. A Collection of Facts and Documents Relating to the History of Medical Science in this Country, from the Earliest English Colonization to the Year 1800, with a Supplemental Chapter on the Discovery of Anæsthesia. By FRANCIS RANDOLPH PACKARD, M.D. Illustrated. 8vo. Pp. 542. Philadelphia and London : J. B. Lippincott Co., 1901.

IN these days of progressive scientific medicine, where almost all that is useful for the practical medical man in his daily routine work is obtained by careful clinical study and painstaking laboratory research, and where all is hurry and rush toward a goal of precision that is ever alluring us onward, it is with the utmost pleasure that one is enabled by such a book as this to lay aside his duties and be allowed to delve into the history of his own past worthies and con the empirical triumphs of the medical ancestry of his country.

To accomplish such a task successfully much useless detail must be gone over, and most patient research in order to complete the defects of previous imperfect work must be made, while the broadest study of the most diverse subjects must be methodically pursued in the hope to extract some desired-for truth that might have otherwise remained hidden and unknown in its unusual situation. To the author the task of unearthing this vast amount of broadly scattered information, with the necessary exercise of patience and judgment to arrange it into a chronological and readable order, has been, as we who revere such work would desire it, " a labor of love."

The work opens with an account of the medical events connected with the early history of the English colonies in America. As the author says, although there is not much available information regarding those who practised medicine in the infancy of the general colonies, yet it is of great interest, " as those men laid the seed of future medical

progress in this country, and many of them seemed to have been possessed of much ability and medical learning, such as it was in their day."

On page 46, in speaking of the broadly accredited belief that the first autopsy in this country was performed in 1690 by one Dr. Kerfbyle upon Governor Slaughter, he unequivocally says: "There are, however, records of four other autopsies which were held at an earlier date than the one on Governor Slaughter." Later, on page 62, the author gives a series of detailed descriptions and most convincing proofs of "The Earliest Recorded Autopsies in America," showing that the first mentioned is to be found in "An Account of Two Voyages to New England," published at London, in 1674, by John Josselyn.

The chapter on the "History of the Medical Societies Founded Before the Year 1800" is one of the most valuable in the book. In it the author states that "the first association of physicians into a society of which there is any record in America was in Boston. It existed from 1735 until at least 1741, when it disappeared in the sands of time."

On page 160 he says that "the first man to receive a medical diploma in North America was Daniel Turner, who received the gift of an honorary degree of Doctor of Medicine in 1720 from Yale College." "The first man to publish a work on a solely medical topic (page 229) was the Rev. Dr. Thomas Thacher, who was born in England." It appeared in 1677, and was entitled "Brief Rule to Guide the Common People of New England How to Order Themselves in the Small Pocks, or Measles."

The portion of the work devoted to the discovery of anæsthesia is most graphic. Attended as it was "by the bitterest and most acrimonious discussion as to who was its real discoverer," the author, after most careful study of the rival claims, makes the following terse and emphatic statement: "In my opinion the credit of first using ether as an anæsthetic is due to Crawford M Long, and the credit of demonstrating its value and use to the medical profession and the world must be ascribed to W. T. G. Morton."

Desultory perusal of many of the contained subjects soon shows a picturesqueness of style and a vividity of scene that irresistibly leads one on page by page until the special topic under consideration has been completed; while, on the other hand, methodical reading of the work, as becomes necessary to the conscientious reviewer, early makes manifest such an earnestness of purpose and so great a desire for contemporaneous proof that the reader involuntarily feels the surety of the assertions and recognizes the authority of the writer.

That its pages may ever remain with us as the best, the most certain, and the most greatly sought-for embodiment of historical research into the doings of the medical guild of our country prior to the nineteenth century—an exposition, as it were, of the early struggles of individual empiricism upon which American scientific medicine of to-day is mainly based; and that the name of the one who has offered us this account of our medical life history, and thus given us inducement to further strive, may be never forgotten among us—are the hopes and the wishes of him to whom the privilege of writing these lines has been given.

C. A. O.

THERAPEUTICS: ITS PRINCIPLES AND PRACTICE. By HORATIO C. WOOD, M.D., LL.D., Professor of Materia Medica and Therapeutics and Clinical Professor of Diseases of the Nervous System in the University of Pennsylvania. Eleventh edition. Remodelled and in greater part rewritten by HORATIO C. WOOD and HORATIO C. WOOD, JR., M.D., Demonstrator of Pharmacodynamics in the University of Pennsylvania. Philadelphia and London : J. B. Lippincott Company, 1900.

A PRACTICAL TREATISE ON MATERIA MEDICA AND THERAPEUTICS, WITH ESPECIAL REFERENCE TO THE CLINICAL APPLICATION OF DRUGS. By JOHN V. SHOEMAKER, M.D., LL.D., Professor of Materia Medica, Pharmacology, Therapeutics, and Clinical Medicine, and Clinical Professor of Diseases of the Skin in the Medico-Chirurgical College of Philadelphia ; Physician to the Medico-Chirurgical Hospital. Fifth edition. Thoroughly revised. Student's edition. Philadelphia, New York, and Chicago : F. A. Davis Company, 1900.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS, WITH ESPECIAL REFERENCE TO THE APPLICATION OF REMEDIAL MEASURES TO DISEASE AND THEIR EMPLOYMENT ON A RATIONAL BASIS. By HOBART AMORY HARE, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia ; Physician to the Jefferson Medical College Hospital. Eighth edition, enlarged, thoroughly revised, and largely rewritten. Philadelphia and New York : Lea Brothers & Co., 1900.

SOME idea of the differences of plan and scope underlying these three works on the same general subject and emanating from teachers holding chairs in three medical colleges of Philadelphia may be gathered from a consideration of their titles and sub-titles. But no one who has not had occasion to critically study and compare them side by side can appreciate from what different stand-points they are written or realize that, though so unlike the others, each one can in its way deserve the highest praise. The veteran Wood, now in its twenty-fifth year and eleventh edition, is so well known and universally used as to require but little description, although in its remodelling some radical changes have been made that deserve more than passing notice. In accordance with the progress that has been made in pharmacodynamics during the last decade whole points of view have changed and new presentations of old subjects become necessary, so that in order to maintain its authoritative position in the literature of pharmacology much recasting of the material has been required. The principal alterations consist in some condensation of the various articles both by rewriting and rearrangement in a more closely knit form, in putting into separate sections, printed in smaller type, the detailed descriptions of the results of investigation on the lower animals, and in relegating to a position at the end of the chapters the references to the literature, which are thus collected and classified in a manner convenient for reference, while at the same time the text is purified of much parenthetical writing that formerly made the page a difficult one to read.

Another feature that will be especially appreciated by students is the concise summary in bold-face type appended to the description of each drug and containing a terse account of its most important physio-

logical actions. Discussions made unnecessary by the advance of knowledge have been dropped and articles on new drugs added, so that the work remains, as it has always been, our most scientific and philosophical work on the physiological action of drugs, and the present volume is so essentially a new one that its acquisition is almost a necessity to those interested.

Shoemaker's treatise is more particularly adapted for use as a textbook, and, indeed, the author has intended it as such, since it is inscribed as a student's edition, and promise is made of a later larger volume designed for the practitioner and containing a greater range of subjects than the present one, which is devoted almost entirely to the drugs of the United States and British Pharmacopœias. For this reason the book is of especial value to the class for which it is designed, since we know of no other commentary on the Pharmacopœia from a pharmaceutical stand-point which is at the same time sufficiently extended in its treatment of drugs to supply an adequate degree of information on physiological actions and therapeutics. Too high praise cannot be given this latter section, for it is unusually rich in formulæ, and the clinical index covers a most exhaustive range of topics, so that it is hard to conceive how another edition can be made more complete save by the addition of articles on the not very extensive list of important non-official drugs.

It is characteristic of the author that, although due importance is given to the work of other observers and their writings and opinions are freely quoted, every essay abounds in original observations and fresh presentations of the subject-matter. This is very strikingly so in the sections on therapeutics, which are rich in reference to the untoward or by-effects likely to be produced, individual susceptibilities to drugs and to practical points in their administration and combination with other remedies, and valuable suggestions in the treatment of disease, so as to at once stamp the author as a clinician of keen discernment as well as a widely read pharmacologist. It is worthy of note that, although three of the authors under consideration employ both the apothecaries and the metric systems, in the present volume the French measures are given the precedence.

In taking up Hare's book, after having turned the crowded pages of the other two works, the first feeling is one of doubt as to whether the ground can be covered thoroughly by such comparatively short articles. But this soon vanishes, for the perusal of one or two is sufficient to convince one of the intensely practical character of the volume. Intended for practical every-day use and written by a practical man who has known how to eliminate all the dead wood of theory and controversy and present facts and useful methods with wonderful clearness and force, the gist of many pages from scores of original monographic articles is condensed into a paragraph and the practical lesson to be deduced expressed in a single sentence, but in no case has accuracy or clearness been sacrificed to conciseness.

Four general subdivisions have been made: First, a brief consideration of general therapeutic principles, incompatibility, contraindications, etc., then the section devoted to drugs themselves, followed by another on remedial agents other than drugs, and a very useful chapter on

Foods for the Sick. The latter portion of the work is given up to short outlines of the most approved plans of treatment of the commoner diseases, arranged alphabetically for convenience of consultation, which is further enhanced by the system of cross-references.

From what has been written it is evident that no one of these books can adequately replace the others. The domain they are intended to cover is so extensive, embracing as it does practically the whole end and aim of the practice of medicine, that it is small wonder that each one may advantageously be supplemented by the other. Each of the three authors has solved the mooted question of the classification of drugs in a different way and in a manner suggestive of the trend of his book. In Wood, which is *par excellence* the reference-book and fruit of scientific years of research and laboratory work, the drugs are grouped according to their physiological action, as depresso-motors, delirifacients, etc. Shoemaker has chosen the pharmacopœial nomenclature and follows its order, laying stress on pharmaceutical points, and, by his graceful and interesting style, making what is usually a dry and difficult study especially appealing to students; while Hare, writing from the stand-point of the busy practitioner, arranges his topics alphabetically, according to their English names, and devotes particular attention to the vicissitudes of every-day practice.

S. E. J.

MENTAL AFFECTIONS: AN INTRODUCTION TO THE STUDY OF INSANITY. Pp. 380. By JOHN MACPHERSON, M.D., F.R.C.P.Eng. London: MacMillan & Co., limited. New York: The MacMillan Company, 1899.

THE volume comprises a series of lectures, extended and rearranged, delivered by the author to students attending the class of mental diseases in the Royal Colleges' School of Medicine, Edinburgh. The modest title of this book, approaching as it does the dignity of a treatise, does not fully disclose its intrinsic value, containing, as it appears, the large clinical experience and deductions of the author derived from his connection with the asylum for the District of Stirling, Scotland, and elsewhere. It is a sidelight also on the mental equipment of a class of medical students that such a course of lectures should form a part of the curriculum of a medical college.

Nineteen chapters are divided into three parts. Part I. is devoted to a consideration of the subject of morbid heredity, by which it is to be understood that the morbid *basis* only persists and is transmitted, the neuroses being transformed in each succeeding generation, and known as dissimilar heredity, or heredity by transformation. Diathetic and nervous conditions are seldom transmitted exactly in the same form from parent to offspring. The appearance of abnormal qualities is ascribed by the author to a defective power to transmit, in part, perfectly normal characters, by which a tendency to degeneration may be corrected, and the crippled development of the spermatic and ovarian cells.

A few of the prominent causes conducive to degeneration are named as: 1. Civilization. 2. Deficient alimentation. 3. Alcohol. 4. Syphilis. 5. Tuberculosis. 6. Infectious and miasmatic diseases. 7.

The arthritic diathesis. All of these causes are discussed, and their influence in the evolution of insanity and allied nervous affections is shown in connection with other active determining influences in producing insanity which the author calls social causes—as civilization, religious and political movements, education; biological causes—as age and sex; physiological causes—as nutrition, sleep and dreams, reproduction and puerperal conditions. Allusion is made to moral causes—as the influence of the emotions, and to physical causes—as environment, the seasons, heat, cold, and traumatism. Among the determining causes of insanity are included all those poisons that act upon the nervous system directly and indirectly—as intoxicants, including drugs, auto-intoxication from various sources, and from micro-organisms introduced into the system, the insanities resulting being recognized as instances of abnormal mentalization rather than the mental symptoms due to organic brain changes. The causes enumerated in hospital reports are usually divisible into those that are called moral and physical.

Much space has been given to hereditary degeneration in its relation to mental disease. While there may be a general agreement that hereditary degeneration is a most important factor, there may be some dissent from the author's views. For instance, it is stated that "insanity is not a chance occurrence like catarrh, an accident, or an attack of typhoid fever. . . . It may therefore be generally stated that in order to become a lunatic a person must inherit a vice of organization which will manifest itself in mental aberration. This vice of organization is called degeneration." We may perhaps discover in these strong assertions a consistency with the theological doctrines of election and predestination, which are said to be so stoutly held in the author's country ; but, while there will remain those who will dissent from a general acquiescence in such views, they are, nevertheless, accepted by large numbers, and deserve attention when they are introduced in the course of trials, as now frequently happens, as a screen to shield a criminal from the consequences of crime. It has happened that some abnormality of the ears, the quality of the hair, an asymmetrical head, a receding chin, have been accepted as a basis to found a plea of degeneration and irresponsibility. At the date of this writing a trial is in progress in a neighboring State where the principal defence is that because of the atrocious nature of the crime, and as the parents were first cousins, the criminal must be a degenerate and therefore irresponsible. From the existence of some appearances of irregular physical development which are visible to the eye, and which may be conceded to be in the nature of degeneracy, the conclusion is reached that there must be a corresponding degree of mental and moral degeneracy that takes the criminal out of the category of responsibility, and with the same reasoning might apply as a test of testamentary capacity. While the author does not announce the extreme doctrines above, they are nevertheless held and exploited on occasions, and we desire to note that the author has devoted an unusual space to the discussion of degeneracy in its relation to insanity.

Part II. is mainly devoted to the consideration of the physical and mental stigmata of degeneration, and, including Part I., comprises one-third of the volume. The remaining chapters are devoted to *Clinical Symptomatology*, or the clinical symptoms of various mental affections,

beginning with mania, melancholia, etc. The author discloses his individuality in following a well-understood nomenclature, and has not clouded his meaning by the use of terms which might require a too frequent reference to a classical dictionary. If in a critical mood, we might ask why the consideration of mania should precede that of melancholia, as the former is so frequently but an evolution from the latter, and we might further add that too little stress is laid upon those neurasthenic conditions that foreshadow so many insanities. In addition to a discussion of several well-recognized forms of mental affection, there are three chapters devoted to the clinical study of toxic insanity and confusional insanity arising from physical exhaustion, nervous shock, or malnutrition, the delirium of collapse, puerperal and other insanities of infective origin, acute delirious mania, microbic toxins, confusional states arising from alcohol and excessive use of drugs, all of which have been studied and recognized more clearly in recent years, and now must have a distinct place. Other chapters are devoted to the insanity of the degenerate, moral insanity, insanity in connection with the neuroses and from organic brain disease. All of these mental affections should have a proper place in the lecture-room. The author has ably and well treated every topic he has considered, has honestly given out the best of his experiences, free from professional dogmatism, and the book will have a foremost place among those of recent years devoted to the consideration of mental affections.

J. B. C.

ATLAS AND EPITOME OF DISEASES CAUSED BY ACCIDENTS. By DR. ED. GOLEBIEWSKI, of Berlin. Translated from the German by PEARCE BAILEY, M.D. Philadelphia: W. B. Saunders & Co., 1900.

THIS book might well be called the prognosis of accidents. There is presented in this volume a systematic description of the sequel of injuries caused by accidents. The book is divided into two parts, one treating of injuries in general, the other of injuries affecting special structures and regions of the body.

The symptomatology of the sequels of the various forms of injury date usually from the termination of both medical and surgical treatment.

The book is based upon an experience of thirteen years with accident cases, or about 5245 cases, many of which have been followed long enough to know the final result. Germany in 1884 passed a law insuring workmen against injury. Under the German method any factor except the extent of the injury is fixed and uniform. In the United States nothing is fixed except the principles of the law in the judge's charge to the jury.

According to the German law the insurance allowance may be diminished or increased according as the injured person gets better or worse with time. It does away with the question of exaggeration.

This law in Germany has been a stimulus to medical men to become familiar as experts with the results of traumatism to the body.

The introduction to the American edition is splendidly written, and is full of suggestions.

The end-results of many fracture cases are carefully recorded. The general results following fractures of different regions are summarized.

The average student in graduating from any of our first-rate medical schools has been so occupied during his student days with the details of his medical and surgical work that he has little time to devote to *prognosis*—he sees patients in the various clinics, but he only exceptionally sees them later. This is particularly true of cases of fracture. Here the prognosis is important. A knowledge of the results of fracture is of very great importance. Few hospital surgeons have a definite notion of these after-results.

In this volume are collected the end-results of the author's many cases of fracture of the bones of the body. The statements may be taken as representing approximately the experience of American surgeons. This book represents the result of an enormous and painstaking industry on the part of the author. It is a pioneer in traumatic surgery, and will repay one for a careful study. The book is profusely illustrated.

If this volume shall stimulate surgeons in this country to a more accurate observation, and a more prolonged observation of their cases in all departments, it will have served a most useful purpose.

Very many medico-legal opinions have little basis in solid facts; the opinions are not well founded, for the very reason that the expert has often little recorded or personal experience upon which to put a judgment. This volume will assist many medico-legal experts who deal with traumatisms. C. L. S.

MANUAL OF DISEASES OF THE EYE. By CHARLES H. MAY, M.D. With 243 original illustrations, including twelve colored figures.

IN the rapid multiplication of text-books it has become necessary to attempt a classification of them according to their contents and the place in medicine which they are supposed to fill. Thus, the name of *quiz compend* has been given to the work of humblest aspirations; *manual* to that of next greater pretension. By *text-book* is usually understood a volume which contains such a complete exposition of the subject of which it treats that the student is enabled to gain a thorough knowledge of it from a study of its pages, while the dignity of the name of *system* is reserved for more comprehensive books, generally of a composite nature, the product of the pen of different authors who are supposed to be particularly fitted to elucidate the subjects assigned to them.

The value of the first two of these, of the quiz compend and of the manual, has ever been doubtful in the mind of the reviewer, as he questions very strongly whether the study of such jogs to memory—for they are but little more—can ever be of lasting good to the reader. These books are particularly recommended by their authors to students and general practitioners—to those, in other words, who are quite unfamiliar with the subject. It would seem that these classes of readers need a book that is not so much concise as it is explanatory, so that in place of these elementary treatises it is the custom of the reviewer to recommend a text-book, of which there are so many admirable examples, to all beginners in ophthalmology.

Dr. May, however, has written a most excellent little book—the best of its class, perhaps—and to those in search of a manual it may be frankly recommended. The arrangement of the subject-matter is excellent, its style easy, and the text gives evidence of having been carefully prepared. W. C. P.

A Treatise on Appendicitis. By John B. Deaver, M.D., Surgeon-in-Chief to the German Hospital, Philadelphia. Second edition, thoroughly revised and considerably enlarged. Illustrated with 22 full-page plates. Octavo. Philadelphia: P. Blakiston's Son & Co.

The chapter on the Pathology of Appendicitis is a most clear statement of the conditions existing. The plates illustrate so well that they add greatly to the descriptive text. This volume is a splendid guide to the practitioner. Only superlative praise can be properly given of the book. .

The symptomatology is grouped about the two great clinical classes of cases—the acute and the chronic. This grouping simplifies one's conception of a disease having such a variety of pathological lesions.

The chapter dealing with differential diagnosis is satisfactory in that all the lesions most likely to be confused with an appendicitis are carefully considered.

The chapter on Treatment discusses the many phases of the subject. No practitioner has a right to advise his patient upon the matter of treatment without the advice of a surgeon who is skilled in the care of appendicitis cases.

Dr. Deaver takes the ground that as soon as the diagnosis of appendicitis is made operation should be done at the earliest convenient opportunity. This is safe advice. There are but few conditions which will justify the delay of operative treatment.

He also thinks that operation is contraindicated in those cases of diffuse peritonitis with distended abdomen, high temperature, rapid pulse, anxious expression, continuous vomiting, and diffused tenderness.

We believe that this desperate class of cases is to be dealt with according to the peculiarities of the individual case. We have seen cases which might properly be grouped in Dr. Deaver's "contraindicated" class operated upon and recover. On the other hand, Dr. Deaver says some such cases unoperated and treated medically have in his experience recovered. These cases cannot be treated as a class. We are of the opinion that many of the desperate cases of general peritonitis have recovered because they were operated upon. We are likewise of the opinion that with very few exceptions these desperate cases are far safer after a rapid operation for cleansing and drainage than from expectant and medical treatment. The moribund cases, of course, should not be operated. The desperate cases that are not moribund, however, should be given the benefit of an operation.

Every practitioner and surgeon should own and read and reread the chapter in this book on the Pathology of Appendicitis; it is wisely written. C. L. S.

PROGRESS

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Intestinal Perforation in Typhoid Fever.—W. OSLER (*Philadelphia Medical Journal*, January 19, 1901), in discussing perforation and perforative peritonitis in typhoid fever, directs attention to the fact that a very large proportion of the cases of perforation show conditions which are not at all characteristic, according to the general description of this condition. He believes that with proper diagnosis surgical intervention would greatly reduce the mortality from perforation, and perhaps about half the cases could be saved. The great trouble is that we know too little about the diagnosis of perforation. His recommendations are that in cases in which the occurrence of perforation is suspected a skilled diagnostician should be, if possible, in constant attendance so that the diagnosis may be made as early as possible, and if perforation occurs surgical intervention should be undertaken at once. The accident is likely to occur during the more severe cases and during the height of the disease. It occurs more frequently in cases showing diarrhœa and tympanites; of 30 cases observed at Johns Hopkins Hospital 20 had diarrhœa and 6 had both perforation and hemorrhage. If marked abdominal symptoms appear perforation should be watched for constantly. He recommends that one should be always on the alert for any distinct abdominal pain, particularly when it shows severe onset and is intense and tends to grow worse; it should be especially determined whether the pain is diffuse or localized toward the lower right side of the abdomen. One should also note whether the abdomen is flat, scaphoid, or distended, particularly whether it is uniformly distended, whether respiratory movements are present over the abdomen, and whether they are uniform and seen both above and below the navel. One should note tension and pain on palpation, muscular rigidity, and spasm, particularly in the epigastric region and right iliac fossa, and whether spasm is found by rectal

examination. The liver dulness should also be watched in the middle, nipple, and mid-axillary lines; auscultatory percussion may be an aid in this. Any tenderness or fulness discovered by rectal examination is important. Blood and sloughs should be looked for in the stools and any change in their character noted. As to the general condition of the patient, any change in expression should be noted, together with increase in the rapidity of the pulse, decided change in the temperature, sudden increase in the respirations, or a shallowness or sighing character of the respiration. The occurrence of sweats, of vomiting, and of hiccough may be important, and one should also look for a change in the leucocyte count, having in mind that there is an almost constant leucopænia in typhoid fever. He describes in detail three cases in which, in the absence of typical symptoms, a diagnosis of perforation was made and operation performed. The first patient died, apparently chiefly from the effects of the disease itself. In the second case death occurred on the table. In this instance the walls of the gut were so swollen and infiltrated that sutures would not hold in the neighborhood of the perforation. In the third case complete recovery occurred. As to the general results of operation in the Johns Hopkins Hospital, Osler mentions one series of 11 cases in which 5 recoveries occurred. In all 16 cases have been operated upon, with 6 recoveries, a percentage of 37.5.

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Disinfection of Typhoidal Excreta.—N. B. GWYN (*Philadelphia Medical Journal*, January 12, 1901), after insisting upon the importance of infected typhoidal urine in the dissemination of typhoid fever, reports his results in studying the effects of various antiseptics upon urine containing typhoid bacilli. In conclusion, he states that milk of lime is not deserving of the name of disinfectant. Carbolic acid is useful only in large amounts and in strong solution if a rapid action is desired. Formalin is efficient, but very expensive for ordinary use. Bichloride of mercury, chlorinated lime, and liquid chlorides are very valuable, are rapid in action, and are efficient in comparatively dilute solutions. For disinfection within five minutes he states that of a 1 : 20 carbolic-acid solution one needs half the volume of the urine to be disinfected; of a 1 : 40 carbolic-acid solution one should use two-thirds of the volume of urine to be disinfected; while of a 1 : 1000 bichloride of mercury only one-fifth the volume of urine is necessary; of a 10 per cent. formalin solution, three-tenths the volume of urine should be used; of saturated chlorinated lime one-fortieth the volume of urine, and of liquid chlorides two-fifths the volume of urine. He states that the disinfection seemed to be quite as rapid in urines containing albumin as in those free from albumin. For irrigation of the bladder he states that solutions of bichloride in strengths of 1 : 100,000 to 1 : 50,000 are most successful. He considers urotropin the only substance which produces any effect when given by the mouth.

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Auto-intoxication.—H. STRAUSS and H. PHILIPPSOHN (*Zeitschrift für klin. Med.*, Band xl., p. 369) discuss the excretion of enterogenous decomposition products in the urine under constant diet and insist upon the importance of constant diet in similar studies. Their researches were carried out

by using a test diet, which they describe. They estimated quantitatively the amount of volatile fatty acids and ethereal sulphates in the urine and made qualitative estimations of the phenol and indican. About 100 results are reported; some of these were obtained in persons who had gastro-intestinal affections, others in patients who had no such disturbance. The normal value for volatile fatty acids in the urine was accepted as between 40 and 80. Alimentary factors were found to have no constant influence upon the excretion of the volatile fatty acids, even diarrhœa having no pronounced influence. Constipation did, however, have a notable effect upon their amount, as well as upon the aromatic oxyacids, the ethereal sulphates, the phenol, and the indican. Changes in the gastric secretion had no notable influence upon the excretion products with the exception of the ethereal sulphates. There was a general tendency to decrease of the ethereal sulphates with hyperacidity and increase with hypoacidity or anacidity. This influence was, however, not at all constant. A very marked increase in the putrefaction products was seen in two cases of disease of the liver. The most important statement which the authors make is that their results lead them to conclude there is excellent evidence that the amount of putrefaction products in the urine varies much more markedly according to the conditions of the tissues in general than in accordance with the condition of the gastro-intestinal tract; in other words, that with normal conditions of the gastro-intestinal tract or with imperfect tissue action the products of putrefaction found in the urine are much increased, while with normal tissues the products in the urine remain normal, often even when there is marked increase in the production in the intestine. They decide from this that, as a rule, when they are increased one is far better justified in speaking of " tissue intoxication " than of " gastro-intestinal intoxication,'' though both may be present. Finally, in discussing some observations concerning the excretion of acetone, they state that a marked increase in the fatty acids in the intestinal contents seems to increase the acetone excretion.

Post-hemorrhagic Hæmoglobinuria.—MICHAELIS (*Deutsch. med. Woch.*, 1901, xxvii., 51) reports the case of a woman who had a sudden, very extensive intra-abdominal hemorrhage from a ruptured tubal pregnancy. On the day after the hemorrhage the examination of the blood showed but 25 per cent. of hæmoglobin, and a few nucleated red blood-corpuscles. The urine, which was examined for the first time the day after the hemorrhage, was of a dark, reddish-black color, and contained a trace of albumin and abundant blood-coloring matter. The centrifugalized sediment showed a few short granular casts and hardly a single red blood-corpuscle. On the following day the hæmoglobin had increased in quantity, but a day later it had entirely cleared up. The patient made a gradual recovery, but, on the fifth day after the disappearance of the hæmoglobinuria, there were slight chilly sensations, a sudden rise of temperature to 38.6° and a fresh attack of hæmoglobinuria which lasted four days.

According to Michaelis, these attacks, occurring during the absorption of a large intra-abdominal hemorrhage, may be accounted for either by the assumption of the absorption of the coloring matter directly into the b'ood and its excretion by the kidneys, or by the formation of a hæmolysin, which,

acting upon the blood-corpuscles of the patient, produced the hæmoglo-binæmia and hæmoglobinuria.

The first possibility seems scarcely probable inasmuch as no such instance has ever been noted, urobilin alone having been found in the urine in such cases. The other possibility, however, is extremely interesting in connection with the observations of Bordet and Ehrlich and Morgenroth. These observers have shown that after continued injections of blood of an animal of one species into that of another, the serum of the animal inoculated acquires the power of dissolving the blood-corpuscles of the other animal. This power is lost by heating to a temperature of 55°, but is acquired again if a little normal serum be added. From many researches Ehrlich and Morgenroth came to the following theoretical explanation of these facts.

The actual blood-dissolving principle is present in normal serum, but fails to exercise its power because it is unable to unite with the molecules of the red blood-corpuscles. The serum of an animal which has received injections of blood differs from normal serum in that it contains a body which, on the one hand, unites with the molecules of the red blood-corpuscles, and, on the other hand, with this dissolving principle, which is present in normal serum, thus favoring the action of the latter upon the red blood-corpuscles. Ehrlich speaks of this specific body, present only in blood which has been treated by this method, as the *immune body*, the other as the *addiment*. The first he calls the *intermediate link*, the latter the *final link*. The *final link* is so unstable that it is rapidly destroyed at a temperature of 55°, while the *inter-mediate link* is more resistant. If, then, one heat to 55° C. the serum of an animal which has been previously treated with injections of blood the *final link* is destroyed, and the serum is thus deprived of its blood-dissolving property. But since the *final link* is present in every normal serum, the addition of a little such brings back again the blood-dissolving properties.

The origin of the *intermediate link* Ehrlich accounts for, according to his antitoxin theory, in the following manner : The molecules of the sheep's blood-corpuscles may contain special chains of atoms which may be indi-cated by the sign $+a$. In certain cells of the organism of the goat there are found chains of atoms which have the property of uniting with this $+a$ group. This corresponding group may be indicated by the sign $-a$. If, then, sheep's blood be injected into a goat all the $+a$ groups will unite with the corresponding $-a$ groups ; but inasmuch as the $-a$ groups must have some physiological importance in the organism of the goat, the goat would of necessity suffer if these groups, which are now put out of function, were not regenerated. Therefore, the organism of the goat produces an abundance of fresh groups of $-a$ atoms, and, indeed, according to Weigert's law, in a quantity far above that actually called for by the organism. The result is that the excess of the $-a$ atom groups are cast off from the mother molecule and accumulate in the blood, forming thus the specific *intermediate link*.

Lately Ehrlich and Morgenroth have called attention to the fact that this *intermediate link* arises not only when the blood of an animal of one species is injected into that of another, but that a hæmolysin is obtained when one injects the blood of one goat into the blood of another. Such hæmolysins they have termed *isolysins*.

The question which now naturally arises is: Why if one injects into an animal his own blood, or if an animal absorbs rapidly an extensive extravasation, does there not arise an *autolysin*—that is, a hæmolysin which destroys its own blood-corpuscles?

One might further ask why there is not always an *autolysin* present in the blood, if, as must be the case, the blood always contains corpuscles possessing the +a groups of atoms. This latter question is easily answered, for the +a groups are not free in the blood, but are bound to the red blood-corpuscles and are, therefore, unable to unite with the —a groups wherever they may be present. For this to occur the +a groups of atoms must be present in the blood in solution, as they would be in the absorption of an extravasation. Why, then, does not an *autolysin* arise during the absorption of an extravasation? This Ehrlich explains in an interesting manner. With the absorption of an extravasation a number of molecules which possess the +a groups of atoms enter the blood and will immediately seek out in the organism the —a groups in excess and unite with them. But this is a stimulus for the organism to produce —a groups in excess and to cast them off. So that free —a groups, in other words, an *autolysin*, should escape into the circulation. But since there is no reason to assume that the +a groups are only found in the blood and not also in other organs, this *autolysin* (the —a groups) is bound not only to the blood-corpuscles but to all other cells which possess the +a groups of atoms. As a result of this, again, an excess of +a groups are produced and cast off, and these escaping in a free state into the blood constitute an *anti-autolysin*. In other words, the appearance of a small quantity of *autolysin* would constitute a stimulus for the organism to produce immediately an *anti-autolysin*. But if this idea be correct one might still expect sometimes to see evidences of the formation of an *autolysin ;* this might, for instance, occur when the absorption of a large extravasation of blood occurs so quickly that the organism has not sufficient time to form a proper quantity of *anti-autolysin*. The authors, nevertheless, had never been able to observe a case of this sort. Michaelis, however, points in an extremely interesting manner to the possibility that this case, in which there occurred extraordinarily severe hemorrhage which was absorbed very rapidly and followed by hæmoglobinuria, *very probably constitutes exactly such an instance.* Ehrlich's hypothesis is, of course, unproven, but the author points out that it is the most satisfactory hypothesis for the explanation of immunity and the development of lysins which has yet been advanced.

Concerning the Antiphlogistic Action of Cold Applied to Points Distant from the Seat of Inflammation.—EMMERT (*Fortschritte der Medicin,* 1901, xix., p. 161), in Goldscheider's clinic, has repeated some experiments which were made by Samuel in 1892, with regard to the antiphlogistic action of cold applied at points distant from the seat of inflammation. Samuel noted that if croton oil were applied to one ear of the rabbit, while the other was immersed in water, the inflammation was materially delayed. In control rabbits the process came on in five hours, while in those in which the opposite ear was immersed, no signs of inflammation were to be noted throughout the experiments, which lasted up to twelve hours. On removing the ear from the water, however, the inflammation began. Samuel's explanation

of this antiphlogistic action was that, owing to cooling of an extensive vascular area, the leucocytes which passed through the vessels were, for a certain length of time, deprived of their active motility. In repeating Samuel's experiments Emmert adopted a somewhat different plan, as he found it difficult to keep the rabbit's ear under water for long periods of time without bringing about conditions which interfered with the experiment. An arrangement was made by which, without much distress to the animal, one leg could be kept under water. It was found that under normal circumstances the time at which the evidences of inflammation set in varied so greatly that it was necessary to retain the leg under water for at least twelve hours, by which time, in the control animals, the inflammation invariably came on. The experiments showed that, by immersion of the lower half of the left hind leg in water at a temperature of from 12° to 15° C., the croton oil inflammation was delayed as long as the leg remained in water. Some of the experiments were continued as long as thirty hours. Another series of experiments, in which the leg was immersed after the inflammation had begun, showed distinctly that the inflammatory process stopped at the point which it had reached at the beginning of the bath.

With regard to the explanation of this phenomenon, Emmert differs from Samuel. He noted, contrary to the observations of the latter, that the temperature of the animal always fell several degrees, and that this fall in temperature always preceded the disappearance of the inflammatory process. It was found, further, that if, while the leg was still in the bath, the animal was warmed so as to prevent this fall of temperature, the inflammation occurred exactly as in the control animals. In another animal exposed simply to cold air there was also a marked fall of temperature and a material delay in the onset of the inflammation. He concludes that the observation of Samuel that the immersion of one extremity of a rabbit in a cool fluid is sufficient to hinder the development of a croton oil inflammation in another part, is true ; that, indeed, the antiphlogistic action of this procedure is even greater than Samuel suspected. Emmert's experiments, however, appear to show that the delay and prevention of the croton oil inflammation depends not upon any special action of the cold on the leucocytes in the exposed area, but upon the marked fall of temperature throughout the whole animal's body. Unfortunately, the practical application of the procedure in man is not possible, experiments by Leube and others having shown that the local application of cold in human beings produces relatively a much less fall of temperature than in animals.

Generalized Tic Convulsif Cured by Respiratory Gymnastics.—PITRES (*Journal de Médecine de Bordeaux*, 1901, xxx., p. 106) presented to the Medical and Surgical Society of Bordeaux, on February 2, 1900, a young man, aged twenty years, who had suffered for eleven years from a convulsive tic of unusual intensity. Every six or eight seconds the patient had violent spasms as rapid as if they had been provoked by electrical discharges, which resulted in quick, sharp movements of his head, trunk, or extremities, accompanied by a sudden expulsion of involuntary cries or inarticulate groans. The health of the patient was good. He was able to eat and sleep, but the movements interfered with his work and resulted in

his avoiding others for fear of ridicule. It was noted that when the patient sang or counted at the top of his voice, or when he took deep, regular, rhythmical inspirations, the attacks diminished considerably in frequency, and it occurred to Pitres that they might be influenced by gymnastic respiratory exercises analogous to those which are commonly employed in the treatment of stuttering. Pitres has recently applied similar methods with success in the treatment of certain more simple tics. Three or four times a day, for ten minutes, the patient was placed with his back against a wall, and was advised to take as slow and deep respirations as possible, raising his arms during inspiration and allowing them to fall during expiration. From the beginning the attacks became less frequent. A month later the amelioration was very evident. At this time the patient had to return to his home. He continued the exercises, however, regularly, and in three months the attacks had become rare. Nine months after treatment none whatever were present, the patient was at work and was apparently entirely cured.

[This case is particularly remarkable in that so good a result appears to have been attained in a tic of so long duration.—W. S. T.]

The Freezing Point of the Blood in Typhoid Fever.—RUMPEL (*Münchener med. Wochenschrift*, 1901, xlviii., p. 223).

In the *Deutsche medicinische Wochenschrift*, 1900, No. 46, Waldvogel published some observations tending to show that the freezing point of the blood in typhoid fever differed materially from that observed under normal conditions. Rumpel, who had already made some observations upon a similar subject in an article which is shortly to appear, being inclined to doubt the methods of Waldvogel, repeated the experiments. Waldvogel's observations showed a remarkable increase in the osmotic tension of the blood in typhoid fever, which resulted in the falling of the freezing point to $-1.68°$ C. The results were striking in that the blood concentration in an osmotic sense is very constant, the freezing point varying, according to Rumpel's observations, extremely little—from $-0.55°$ to $-0.57°$ C. Waldvogel, in his observations, used the blood serum of typhoid patients which had been taken for the Widal reaction, the blood having twice remained twenty-four hours upon ice. As the quantity of the serum which was used was too small for the determination of the freezing point, it was diluted several times with distilled water. Instead of the ordinary glass cylinder of Beckmann's apparatus a wide test-tube was used, and in place of the mixer the thermometer itself. Apart from the various sources of error which must be connected with this method of procedure, Rumpel saw in it no great simplification of the ordinary method ; and in his observations he took 15 cm. of blood directly from the vein, introducing it immediately into the cylinder, and making the estimation immediately after defibrinating the blood, by stirring with a platinum ring. By making comparative tests according to his own method and that of Waldvogel, he was able to demonstrate the many sources of error in the former. He then made estimates of the freezing point of the blood in eleven cases of typhoid fever which were at that time in the hospital. The examinations were made at various different stages of the disease. In all instances these showed an entirely normal blood concentration in an osmotic sense—that is, the freezing point varied between $-0.56°$ and $-0.57°$.

The author observes that, owing to the few investigations, one is not justified in assuming that the osmotic tension of the blood in typhoid fever is always normal, but that, in comparison to Waldvogel's twenty-two cases, his eleven, in which the examination was made in a more careful manner, showed no abnormal deviation of the freezing point.

SURGERY.

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Compression of the Pedicle of a Movable Kidney by a Distended Gall-bladder Containing Calculi.—REYMOND (*Revue de Chirurgie*, June 10, 1900) states that it is not always possible to diagnose between these two conditions, and the diagnosis of the case becomes especially difficult when the two conditions coexist, as is well shown in the author's case, which was that of a woman, aged thirty-eight years, married, had five children, and one tubal pregnancy, the latter requiring operative interference for its relief. Eight days previous to her admission to the hospital violent exertion was followed by severe pain in the right flank ; this was so severe as to make her keep in bed. Examination showed an irregular pulse, fever, pinched facies, but no trace of jaundice. Vomiting was persistent on attempting to take nourishment. The urine was normal. The patient complained of being always in pain, which at times became more acute ; it was felt in the hypochondrium and right flank ; some pain was felt along the course of the ureter, while at times it ascended to the right shoulder. The abdomen was distended, and so sensitive on palpation as to make an examination most difficult. On palpation a hard, irregular tumor, situated somewhat deeply, was noted in the region of the gall-bladder. There was marked dulness on percussion, and further examination enabled one to limit this tumor. It descended to two fingers' breadths below a horizontal line passing through the umbilicus ; to the inner side it extended to the median line, while to the outer side its limits were less precise. The tumor had a pear-shape, and moved during respiration. Beyond the limits of this tumor was a second mass of more homogeneous consistence, situated backward below and to the outer side of the first tumor, and having the form of an enlarged kidney. These two masses could not be separately moved; they gave the impression of a bilobar tumor and not that of two separate and distinct tumors.

Operation. An incision was made in the loin over the tumor. On exposing the tumor it was found to consist of an hydronephrotic movable kidney and an enlarged gall-bladder. The kidney was secured in place in the usual manner, and the wound closed temporarily. Seven days later a cholecystotomy was performed, and sixty grammes of pus and four calculi were removed. The gall-bladder was sewed in the wound, and three weeks later the wound was closed and the patient made an uninterrupted recovery. Bacteriological examination showed the presence of the colon bacillus. The symptoms in this case pointed to the gall-bladder and also to the kidney. It is important to know if these two conditions are coincident or if one is produced by the other. According to Potain, the gall-bladder is the one primarily affected, while Roux claims that the displacement of the kidney is primary. It exercises traction on the cystic duct by the medium of the right border of the hepatoduodenal ligament, and thereby obstructs the course of the bile and favors the formation of calculi. Each of these hypotheses is more or less true, but it still remains to be shown definitely which one is right.

On Gonorrhœal Rheumatism.—LORIMER (*The Quarterly Medical Journal,* November, 1900) states the following conclusions: (1) That the different descriptions of gonorrhœal arthritis depend on the fact that a uniform type of ordinary rheumatism has not been taken as a standard of comparison and contrast, and, therefore, many of the alleged differences are not essential distinctions, but are simply dependent on the degree of pyrexia. (2) That, excluding cases of ordinary acute rheumatism occurring during gonorrhœa, there are three distinct forms of gonorrhœal arthritis: (*a*) The rheumatic form, in which the disease is at first identical with acute rheumatism, but as it proceeds the pyrexia becomes subacute, the migratory arthritis ceases and becomes fixed in one or two joints, where it runs a tedious and protracted course. It is in this form that cardiac complications may appear and that the analogies with ordinary rheumatism are more apparent. (*b*) The subacute type, or true gonorrhœal arthritis, constitutes the largest proportion of cases. Cardiac complications are seldom present; there is absence of acid perspiration, a stationary type of arthritis, a liability to chronic articular changes, sometimes suppuration, and marked muscular atrophy. (*c*) The chronic asthenic type, frequently monoarticular in scrofulous subjects, with hydrarthrosis and frequently effusion of seropurulent fluid. (3) That scarlatinal rheumatism and gonorrhœal rheumatism have certain distinctions in common, such as rarity of cardiac complications and liability to suppuration; but, on the other hand, the fugitive character of the former contrasts with the persistent character of the latter. (4) That in regard to chronic articular changes, gonorrhœal arthritis occupies an intermediate place between ordinary rheumatism and arthritis deformans; for on the one hand, though the joints do not quickly return to their natural condition, they hardly ever proceed to further destructive changes.

Of the hypotheses which have been propounded to explain gonorrhœal arthritis the two chief are: (*a*) The neuropathic, which ascribes the arthritis to inflammatory irritation gradually propagated from the urethra to the sacral plexus and spinal cord, where it affects the trophic centres of the joints.

This hypothesis came into fashion with Charcot's description of arthropathies in locomotor ataxia. (1) But the articular lesions in ataxy and syringomyelia are different in character from those of gonorrhœal arthritis. (2) It has to explain why the degree of irritation is in no way related to the articular and general symptoms; why new joints become affected while the irritation is subsiding, and why, in the most violent cases of urethral irritation, gonorrhœal rheumatism is rarely observed. (3) Moreover, it does not explain the abarticular phenomena of the disease. (4) It fails to explain those cases of arthritis following ophthalmia neonatorum without urethritis. (b) The toxæmic, viz., that the arthritis is due to the dissemination of a specific micro-organism—the gonococcus—a hypothesis which is believed to offer a better explanation of the phenomena of the disease, but which, however, is still sub judice.

Intraspinal Cocainization from the Anæsthetist's Stand-point.—GOLDAN (*New York Medical Journal*, December 22, 1900) states that the possibility of extending the use of the method by making the injection into the cervical portion of the canal has recently been advocated and based upon the researches of Tait and Caglieri, who base their observations on three cases. In the first two cases 0.5 and 1 c.cm. respectively of a 1.5 per cent. solution of cocaine were used and produced anæsthesia in eight and five minutes respectively. In the third case, in which 3 c.cm. of a 0.5 per cent. solution were used, no anæsthesia was obtained after the lapse of one hour and twenty-eight minutes. This patient complained of cephalalgia, intense heat over the entire body, copious perspiration, and slight vomiting. The following day slight headache and weakness in the legs ensued. While it is true that the puncture of nerve trunks by a needle is harmless, the author fails to find any authority for saying that the puncture of the spinal cord is or may be harmless. We know that the cord averages but 1 cm. in diameter; to use the spinal puncture and injection in the cervical region, or any other above the second lumbar vertebra, means the introduction of a needle not only into the subarachnoid space but often the cord as well. Now, such a needle, no matter how fine, must do one of two things: it must either sever the fibres or push them aside, and as some of the columns of the cord are probably no longer than the needle itself, severing them would always have to be considered as a possibility. The cord tissue once severed, we are taught, never regenerates, and here the possibility of remote complications, such as ascending or descending degeneration, comes in.

It has been said that in those cases in which, for any reason, a general anæsthetic must be administered where the spinal puncture and injection have been performed it is surprising how quickly these patients are anæsthetized and subsequently regain consciousness. In the first place, these patients cannot be anæsthetized more rapidly than if they at first had not had cocaine, nor is consciousness more quickly regained or the quantity of the anæsthetic lessened. We must be fair and not accept as true that which is only apparently but not actually so. Is there any reason why a patient who has had an operation half-finished with cocaine, and in whom chloroform or ether has then been substituted, should have used more than half the quantity that he otherwise would? Is it not a fact, which all must admit

who have used the spinal method, that these patients are shocked? and, further, is it not true that patients in a condition of shock require lesser quantities of anæsthetics than those in whom shock is absent? To say that patients do not suffer from shock at all comparable with that from general anæsthesia is absolutely untrue. Only those who have seen patients in whom the lumbar puncture and injection have been performed, showing the extremely rapid and small pulse, from 120 to 150 a minute, and at times suddenly falling to half that rate and becoming full; the rapid and shallow respiration, the ashy-gray pallor, the at times slightly cyanosed condition of the skin, finger-tips, and mucous membranes; and the profuse perspiration, can say whether this is true. If this is not shock, what is it? And it is a shock so great in its intensity that it can be compared only with very profound chloroformization; it is a condition of which one experience is quite sufficient; and these symptoms have occurred in the experience of those who have used the method extensively, with so small a quantity in some cases as 1 c.cm. of a 2 per cent. solution (one-sixth of a grain of cocaine). From the stand-point of time-saving, of preservation of consciousness, or of convenience this method cannot commend itself in the vast majority of instances to either the patient or the surgeon in preference to general anæsthesia by either nitrous oxide, ether, or chloroform, properly selected and skilfully administered. It has been said that the method might be useful in cardiac, pulmonary, and renal diseases where a general anæsthetic is indicated. As the patients in whom the spinal anæsthesia has been employed often manifested at first an extremely small and rapid pulse, which was at times suddenly followed by a full, very slow pulse, it does not seem to the author to be compatible with safety, particularly in cardiac or pulmonary disease where there is any tendency to venous congestion. That one of Tuffier's patients died of asphyxia, and upon autopsy a pulmonary thrombus was found, can easily be explained by this marked circulatory depression. In renal disease the method may be of value in preference to a general anæsthetic. It has not, however, been shown as yet that even in such a case cocaine itself might not prove deleterious. The author has had such a case of renal disease where the surgeon considered a general anæsthetic contraindicated; spinal anæsthesia was attempted, and after two punctures and injections aggregating half a grain of cocaine, anæsthesia failed to be induced and chloroform was administered, with no untoward results during or after the anæsthesia. There are few patients requiring surgical interference that cannot take one of three general anæsthetics if properly selected.

Exclusion of the Intestine.—TERRIER and GOSSET (*Revue de Chirurgie,* December 10, 1900), after reviewing in detail a series of fifty-two cases, state, in conclusion, that at this time there is nothing to be gained by discussing the value of the operation of exc'usion with total occlusion of the part excluded, for the reason that all surgeons agree in rejecting this method of treatment. In the case of fecal fistula or of tuberculosis of the intestines the operation that should be given the preference is that of exclusion with partial occlusion of the part excluded. The future shall determine if the operation of choice for cases of inextirpatable cancer of the intestines is

unilateral exclusion and if the flowing back of the intestinal contents into the portion excluded is really to be feared.

A Fatal Case of Cocainization of the Spinal Cord.—GOILAV (*Bull. et Mem. de la Soc. de Chir. de Bucharest*, May 3, 1900) reports the case of a man, aged sixty-seven years, whose leg he amputated at the site of election under spinal anæsthesia. After withdrawing about one gramme of cerebro-spinal fluid an injection of 1.5 centigrammes of a 1 per cent. solution of cocaine was made between the fourth and fifth lumbar vertebræ. Anæs-thesia was complete in fifteen minutes and was perfect throughout the operation. During the operation the patient complained of headache, for the relief of which one-half gramme of antipyrine was administered, with but slight effect. He was also given coffee, but the result was nega-tive. The operation lasted forty minutes and then the patient was placed in bed between hot-water bottles. Two hours after the operation the patient had a severe chill, the temperature went up to 38° C., and the pulse became weak and frequent (102). Later, the temperature became 39° and the pulse 125, the throat, tongue, and lips very dry, and finally the patient became delirious. At intervals hypodermatic injections of caffeine and of ether were given, and finally two injections of serum, each of 500 grammes. Syncope soon came on and was followed by coma, and twenty hours after the operation the patient died. Perspiration and the secretion of urine were much diminished after the operation. The author states that he has employed spinal anæsthesia (cocaine) in two cases; in one there was the fatal result just described, while the other showed all the symptoms of pro-nounced cocaine intoxication, but recovered. In conclusion, it may be said that in those cases of obliterating arthritis complicated by arterio-sclerosis with thickening of the aorta the employment of intraspinal injections of cocaine is not only dangerous, but in some cases it may directly cause the fatal result.

Subperiosteal Fractures.—COTTON (*Boston Medical and Surgical Journal*, November 29, 1900) states that the usual type of green-stick fractures is, of course, subperiosteal, but beyond this the correspondence between the types is not close. The usual type of green-stick fractures is familiar enough. There is a giving away of the bone on the convex side—a tearing apart—while the concave side shows simply a bending of the cortical layer. There is deformity on account of the difficulty of returning the torn bone surfaces on the convex side back to the proper position, while the lack of mobility is insured by the intact layer of bone on the inner concave side, even apart from a locking of the torn bone surfaces and from the strength of the untorn periosteum. Some experiments were carried out on the cadavers of new-born and presumably normal infants to see how readily clean fractures could be produced and how much the periosteum hindered displacement at the time of breaking and on subsequent manipulation. Fractures were produced first by slow, forcible bending in the hands. There resulted : (1) In a femur : green-stick fracture; periosteum intact. (2) Tibia : green-stick fracture, with a Y-shaped fracture line ; periosteum intact. (3) Tibia : exactly the same result—typical green-stick fracture. (4) Clavicle : the

bone could be bent double and back again, with some breaking of bony substance, but no definite fracture line. In none of these experiments was there any difficulty in forcibly reducing the fracture and bringing the bone back to the straight line or any necessity of completing the fracture to get good position—a much-mentioned measure which has seemed as unnecessary clinically as it proved to be experimentally. In conclusion, it seems that fractures in children showing no deformity and no appreciable mobility are not uncommon; that they might readily be overlooked; that they often need no reduction, having no deformity ; that they repair with callus and quickly.

The Abortive Treatment of Gonorrhœa.—PLICQUE (*La Presse Médicale*, March 31, 1900) says that the object of the abortive treatment should not be to stop the discharge immediately, as such methods are not followed by the best late results, but are liable to produce deep injuries of the mucous membrane and give rise later to stricture, although the discharge stops immediately. The real object should be to stop the disease in the early stage, and by gradual treatment subdue the inflammation that is at the bottom of it.

There are three methods discussed : 1. That of Neisser, who uses the new silver salts in injections, argentamine enzomine, and protargol. 2. Janet's method, by the lavage of the anterior urethra with large volumes of solution of potassium permanganate under pressure, their strength varying from 1 to 4000 to 1 to 500. 3. The method of Nogués and Hagge—the irrigation of both the anterior and posteror urethra, whether there is a posterior urethritis or not, the only precaution being to use a weak solution (1 to 2000) for the posterior urethra.

The best clinical practice is to take the better of the two latter methods. Irrigations with large volumes of weak solution of both urethras, anterior and posterior, with the simplest technique is the best. When applied in the incipiency of the disease it cures 87 out of 100 cases. After the fifth day the proportion is 11 to 100 ; above that limit it is not justifiable. The treatment should not be continued indefinitely ; it should stop as soon as the gonococcus disappears from the pus, or five or six lavages later. Solutions of 1 to 10,000 have an action as remarkable as the stronger. They have the great advantage of not provoking pain, serious reaction, or congestions.

The lavages should take in the whole urethra, and in fact, should be urethro-vesical, since the invasion of this portion of the urethra often takes place early. One can never be certain that it is not already present. The patient should always urinate before the lavage. The urethra is then rendered insensitive by injecting a 1 to 20 solution of cocaine into the whole urethra as the patient lies upon his back. It has also the advantage of suppressing the sphincteric reflexes and facilitates the penetration to the depths of the irrigation. The meatus should be carefully cleansed with cotton and boric-acid solution before any manipulation.

Guiard prefers a simple syringe of the fountain type that is uniform in action and conveys no sensation of the pressure exerted to the operation. The other form has the advantage of conveying to the operator an idea of the pressure and progress of the fluid through the urethra, and is capable of regulation. When used by the patient the fountain syringe is preferable. A pint should be passed at a height of about two feet for the syringe above

the bed, and another pint with an elevation of three feet. The entrance of the fluid into the bladder should be hoped for rather than avoided. Two lavages a day are sufficient. Where there is great toleration, as in old cases, the proportion may be raised to 1 to 4000. In favorable cases the discharge decreases, after five or six lavages, to a little, clear drop that moistens the meatus. The irrigations should then be made once a day, then every thirty-six hours, then every two days. The strength can be decreased to 1 to 10,000. If there are symptoms of a relapse, more frequent lavage is to be employed. The urethra remains receptive for some weeks. Indiscretions in diet, drink, or sexual indulgence provoke recurrences. The patient must, therefore, be kept under observation. The solutions must be made from a stock solution of 1 to 100. It is dangerous to use the crystals, for if they do not dissolve they pass into the urethra or bladder and cause intense burning pain.

Fracture of the Two Condyles of the Femur without Articular Phe-nomena.—GROGNO r (*Gaz. Med. de Nantes*, Nov. 3, 1900) states that the inter- and supra-condyloid fractures of the femur in which there are three fragments are characterized by a separation of the condyles on moving the knee-joint and are accompanied by a considerable articular sound. These, with the mobility of the fragments, constitute sufficient physical signs to make a diag-nosis. He reports the case of a man, aged 66, who had a fall from a ladder. On examination the left leg was found to be rotated outward, and on measure-ment it was nearly three centimetres shorter than the other leg. The knee was not swollen and still presented its three normal depressions. About three centimetres above the upper border of the patella was a small wound, the upper lip of which was hard and elevated, while around it was a large ecchymosis. On palpation abnormal mobility was felt above the articulation with distinct crepitus ; pain was referred to the anterior surface of the knee and the inferior extremity of the femur. The upper fragment was felt im-mediately beneath the skin at the anterior and internal part of the thigh. Probing showed that the wound in the skin was the result of the skin being pierced by the upper fragment. The popliteal space was in every way nor-mal and the patella was freely movable. The diagnosis was made of supra-condyloid fracture of the lower extremity of the femur complicated by a wound communicating with the fracture. It was noted that in the region of the articulation there was no swelling, no synovitis, no transverse enlarge-ment with movement of the condyles, and no interference with the move-ment of the patella, which are all symptoms of penetration of the joint. The wound was dressed antiseptically and continuous extension applied. On the thirteenth day the patient presented the symptoms of pneumonia, and on the nineteenth day after the accident he died. The autopsy showed that the lower fragment was in a correct position, but that this fragment was divided into two segments by a vertical line of fracture which passed exactly in the middle between the condyles into the articulation. At no time could crepitus be obtained from this intra-condyloid fracture as the condyles were maintained in place by an unbroken periosteum. There was no suspicion that the supra-condyloid fracture was complicated by the presence of another intra-condyloid fracture with penetration of the knee-joint, for there was an entire absence of symptoms which would have indicated such a complication.

PEDIATRICS.

UNDER THE CHARGE OF

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Staphylococcic Enteritis in Breast-fed Infants.—MORO (*Jahrbuch für Kinderheilkunde*, 1900, Band ii., S. 530) has undertaken to investigate the causation of an enteritis in breast-fed babies which cannot be explained by the ordinary causes due to dietetic errors in the mother or by such accidental disturbances as overfeeding or simple exposure to cold. He has examined in Escherich's clinic the stools of nurslings affected with dyspeptic troubles, and in a large number of these cases has found staphylococci.

This staphylococcic enteritis begins as an acute intestinal catarrh. Vomiting and loss of weight do not occur and fever is rare. The stools, which are acid in reaction, are ordinarily serous and are expelled in a jet. Recovery is the rule.

If the stools are examined by the staining method of Weigert-Escherich it is observed that the "blue" coli bacilli which normally exist in the stools of breast-fed infants are almost entirely replaced by staphylococci. Few at the beginning of the enteritis, they increase during the progress of the trouble and disappear as the infant recovers, when they are replaced by the blue coli bacillus. These organisms, whether white or golden, are not virulent for mice or rabbits. They manifestly come from the mother's milk, being derived from the skin or from the superficial parts of the galactophorous canals, and are swallowed with the milk. The reason why all breast-fed infants are not thus affected depends upon the number of organisms entering the milk, upon the resistance of the organism of the infant, and upon the bactericidal power of its digestive juices.

The Presence of the Proteus Vulgaris in the Stools of Dyspeptic Infants.—BRUDZINSKI (*Jahrbuch für Kinderheilkunde*, 1900, Band ii., S. 469) has examined the dyspeptic and fetid stools of a number of artificially fed infants in Escherich's clinic, and in all the cases found the proteus. Injected under the skin of mice, the proteus with its toxins caused death, but when cultures were mixed with the food of young dogs, kittens, or mice no diarrhœa or other morbid symptoms were produced.

Inquiring into the source of the contamination, the author examined samples of the raw or boiled milk employed in the service. The proteus was found in only one instance, in a sample of boiled milk which had remained for twenty-four hours in the hospital. It was also found that in boiled milk the proteus grew well, while in fresh milk only irregularly, and

in acid milk did not develop at all. The symptoms of auto-intoxication observed in dyspeptic children with fetid stools (pallor, weakness, loss of appetite and weight) are attributed to absorption of toxins formed in the intestine by the proteus.

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Hereditary Syphilis in the Second Generation.—FOURNIER (*Wiener klinische Wochenschrift*, 1900, No. 43) has made a study of the progeny of forty-six marriages in which either both husband and wife had hereditary syphilis or the mother was affected and the father healthy. One hundred and forty-three pregnancies resulted, from which there were 39 stillborn infants, 43 abortions, and only 63 living children. Nearly all of these showed stigmata of degeneration, dystrophies, etc., and lesions, the most frequent of which were defects of eyes and teeth. These results show that children of the second generation are affected as markedly as are those of the first, and one may expect that these effects can be seen even in the third and fourth generations.

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Three Varieties of Membranous Angina Produced by Organisms Other than the Klebs-Lœffler Bacillus.—Systematic bacteriological examination of cases of angina has shown that other micro-organisms than the Klebs-Lœffler bacillus are capable of producing membranous deposits which closely resemble in clinical appearance those of a true diphtheria.

WILLIAM G. BISSELL (*Buffalo Medical Journal*, December, 1900, p. 312) distinguishes three varieties of these non-diphtheritic anginas, due respectively to the streptococcus pyogenes, the micrococcus of sputum septicæmia, and the oïdium albicans. In the experience of the Bureau of Bacteriology of Buffalo, the oïdium albicans has never produced a membranous condition of the tonsils that has resulted fatally; but instances of streptococcic and sputum-septicæmic infections have frequently occurred, followed in several instances by death of the patient. These conditions cannot be classed with the contagious diseases in the true sense of the term, for though capable of transmission by direct inoculation they do not seem to be communicable. One fatal case of streptococcus angina in a child occurred in 1896, and Dr. Biggs, of the New York laboratories, stated that several fatal cases had occurred in New York. Another case reported to the author by Dr. Thomas Bagley, of Buffalo, was a severe streptococcus tonsillar infection in a boy, aged ten years, which apparently in the last extremity was cured by antistreptococcic serum. The membrane extended from the tonsil to the pharynx, into the post-nasal passages, and entirely covered the soft palate; the right tonsil was completely covered.

A fatal case of membranous tonsillitis due to the micrococcus of sputum septicæmia occurred in Buffalo in 1897. The patient was a young woman, and death resulted about the tenth day of the disease.

As regards the oïdium albicans, many instances have occurred in the experience of the Buffalo laboratory in which the physician has recorded diphtheria and the culture revealed only an abundance of the thrush fungus. The membrane in these conditions has been noted as being present on the tonsils, the sides of the cheeks, the uvula, and, in one instance, a cast of the upper portion of the œsophagus was submitted for inspection. From the

sanitary stand-point, none of these non-diphtheritic anginas require quarantine.

A Method of Rendering Cow's Milk Easily Digestible.—VON DUNGERN (*Münchener medicinische Wochenschrift*, November 27, 1900) suggests the following plan : The milk can be first boiled, if desired. Just before feeding the milk is heated to the temperature of the body and slightly coagulated with a small amount of rennet; it is then stirred to break up the curd, which is thus comminuted, and the mixture resembles normal milk. Children take this readily and the danger of the formation of large, tough curds is obviated. The author has used this method extensively, with very gratifying success.

Glandular Fever due to Pneumococci.—LONDE and FROIN (*Revue mensuelle des Maladies de l' Enfance*, February, 1901, p. 78) report a case of so-called glandular fever (fièvre ganglionnaire) in a child, aged three years, which gives suggestive data on the etiology of this as yet imperfectly understood condition. The child's grandfather had died of pneumonia on August 16th, and had not been isolated from the child until the later stages of the disease. Shortly after the funeral the child developed coryza and a slight cough and was taken to the country, where she remained until about the beginning of September. Five days before coming home, after exposure to cold, she had become suddenly feverish ; and on the following day swelling on the left side of the throat was noticeable. This was found to be due to enlargement of two glands, one submaxillary, the other retromaxillary. Pressure over the latter was distinctly painful, but over the other gave rise to little or no complaint. There was also diffuse redness of the pharynx, with coryza, but no stomatitis and no swelling of the tonsils or of the posterior pharyngeal wall. A certain degree of polyadenitis was noticeable. From this time on the redness of the throat rapidly disappeared, but fever of intermittent type continued for four days and the swelling gradually localized itself in the retromaxillary region. By September 15th the fever had disappeared and only slight swelling of the two glands remained. This was still noticeable a month later, and there were evidences of enlarged axillary ganglia and also of tracheobronchial adenopathy. Bacteriological examination of the throat at the height of the febrile stage revealed the presence of the pneumococcus of Talamon-Fränkel, which was fatal for guinea-pigs in twenty-four hours.

The actual causation of the adenopathy is attributed to the nasopharyngeal catarrh of three weeks' duration, aggravated by taking cold. The pneumococcus found in the throat had without doubt existed there in the same degree of virulence since the beginning of the coryza, which began about the time of the grandfather's disease and was probably contracted from that source. In this the case resembles Hirtz's case, reported to the Société des Hôpitaux, October 26, 1900. The term glandular fever seems to the authors to be justified in this case. The infection had been general from the start, and during its height it seemed that the adenitis was responsible for the recurrences of infection.

According to Neumann and Comby, this affection generally depends

upon a streptococcus. The interval between the coryza and the explosion of the glandular fever is explained by our modern ideas of the parasitism of the bucco-pharyngeal mucosa (Widal, Besançon). Conditions of resistance are essentially variable in man, and one can conceive that their etiological influence is preponderant in the diseases caused by our habitual guest, the pneumococcus.

A Case of Transmission of Measles from Mother to Fœtus.—TELES-FORO FIORI (*Gazz. degli osp. e della clin.*, June 10, 1900) states that transmission of measles through the placental circulation has been recorded in only six instances. In fourteen cases of pregnancy complicated by measles there were eleven abortions or premature births. The infants born at term and attacked by measles almost all die in the first days of life.

The case observed by Fiori occurred in a grave epidemic. The mother was a peasant, aged twenty-two years, who had borne a child at term in 1897. On May 20, 1899, at the end of a second pregnancy, she developed a measles rash, which had almost disappeared on the 23d, the day after her baby was born. The infant, a girl, appeared to be fully developed; on the skin of the face and neck were morbillous macules of large size, leaving little interval of healthy skin. There was also conjunctivitis, lacrymation, and rhinitis, with a few râles in the lungs. By May 27th the exanthem had extended to the entire body. On June 1st desquamation had begun, and by the 6th the baby was entirely well.

THERAPEUTICS.

UNDER THE CHARGE OF

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Diabetes Mellitus and Salol. —DR. TESCHEMACHER, adopting the recommendation of Ebstein to use salol in diabetes, reports his observations on nine patients. Of these six were helped, in the others the action was *nil*. The action was developed independent of dietary regulations. The drug was given in comparatively large doses (fifteen grains) three or four times a day for five to six days. An interesting feature of this observation was that the polarity of the sugar in the urine was inverted. After the drug is discontinued the sugar slowly reappears.—*Therapeutisches Monatshefte*, 1901, Heft i., S. 23.

[The author's observation might have been of more service if he had indicated what the types of diabetes were that he was treating. As a general proposition it may be stated that while salol is useful in most instances of hepatic and in few of pancreatic diabetes its failures are by no means infrequent.—R. W. W.]

Dyspeptic Glycosuria and its Treatment.—DR. ALBERT ROBIN, in the examination of the urine of 1600 patients suffering from gastric hyperæsthesia, found that 5.2 per cent. contained sugar. In one set of these patients alimentary glycosuria was in evidence ; in a second there was a true diabetes, not differing from other forms of diabetes save in the matter of its origin. To this latter class he gives the name dyspeptic diabetes. It is a type distinctly amenable to treatment, although it may be converted into a persistent and chronic diabetes. This dyspeptic glycosuria may form a preface to chronic diabetes. The chief pathogenic factor, according to the author, is a lack of, or an irregularity in, the reflex stimulation of the glyconic functions of the liver. In the treatment of the simplest cases an absolute milk diet may suffice. If the glycosuria persists, moderate stimulation of the liver may be indicated. Antipyrine with sodium bicarbonate, sodium and potassium arsenites, codeine, belladonna, and valerian are among the best remedies for this purpose. Should the sugar continue and the line that separates glycosuria from diabetes be passed, the treatment recommended is as follows : Strict hygiene ; one hour and a half before lunch and dinner a powder consisting of antipyrine and sodium bicarbonate, āā three grains, should be taken in a little Seltzer water. Vichy water to be taken during meals. After eating the patient should take a powder of calcined magnesia, sodium bicarbonate, and prepared chalk, āā about ten grains. If there are severe attacks of pyrosis with augmentation of the sugar, Robin advises the following : Calcined magnesia, ℨlv; bismuth subnitrate, ℨij ; prepared chalk, ℨij ; codeine, gr. i ; sodium bicarbonate, ℨijss. Divide in ten powders, to be given in intervals between eating. Proper dietetic measures should be followed. Fowler's solution in three to five-drop doses, t. i. d., may be of service as accessory medication.—*Revue de Thérapeutique*, 1901, No. 68, p. 103.

Treatment of Diabetes.—DR. VAN NOORDEN, in a study of some 600 cases of diabetes, gives the following general results obtained under varying lines of treatment. Jambul, used as the extract in drachm doses in water before luncheon and on retiring, is a good general drug. While it has no very marked action on the elimination of the sugar, in combination with diet and other hygienic procedures it is of service. In certain cases in which it seems necessary to increase the amount of carbohydrates ingested, the use of sodium salicylate, or of aspirin, is followed by a diminution in the amount of sugar, or, rather, the sugar excreted is held in check, notwithstanding the increase in the amount of carbohydrates taken. Carlsbad waters, especially when taken warm, have a beneficial action on the patients, especially on the dyspeptic symptoms. In a few instances the use of ordinary warm water has been followed by excellent results. As aids to special indications in the treatment a number of remedies may be useful. The salicylic acid compounds have a beneficial action on the pruritus ; bromides

are valuable for the nervous symptoms, notably the insomnia and cardiac palpitations. Opium is indicated only for those patients who develop grave neurotic symptoms as a result of enforced dietary hygiene. Of the various analgesics, antipyrine is of service in the treatment of neuralgia. Diarrhœa, flatulence, or other intestinal disturbances are best treated by bismuth preparations. The salicylates have given the best results, notably the di-thio-salicylate or thioform.—*Deutsche Praxis*, 1901, No. 1, S. 1.

Treatment of Insomnia.—DR. G. LYON, speaking of the general lines of treatment, says that hygienic measures occupy a foremost place. Alcohol, tea, coffee, and tobacco should be stopped, and the diet regulated. It is unwise to permit such patients to eat too heartily, and all foods which have been found to digest slowly should be avoided. This is of importance, as patients should not be permitted to sleep while digestion is going on. The temperature of the sleeping room should not be above 60° F. It is inadvisable to have a fire in the room, and the windows should be open. From the stand-point of medicinal treatment he recommends for simple insomnia trional, chloralose, urethane, amylene hydrate, and somnal. In conditions accompanied with fever potassium bromide with a small amount of morphine is one of the best hypnotics. In insomnia from pain he recommends morphine hypodermatically, chloral, combined with morphine and hypnal, being analgesic from the antipyrine it contains. In certain special forms of insomnia definite medication is advisable ; thus for tertiary syphilis potassium iodide is of more value than hypnotics ; in cardiac diseases, circulatory remedies ; in paludal poisoning, quinine sulphate ; in Bright's disease, a milk diet ; in tuberculosis, morphine is of more value, and in insomnia of dyspeptics, dietary regimen.—*Revue de Thérapeutique*, 1901, vol. lxviii., p. 178.

Morphine and the Stomach.—DR. B. HIRSCH considers two features of the action of morphine on the stomach—its effects on the motor mechanism and on the secretion of normal hydrochloric acid. Fluids when taken by the normal stomach are passed into the duodenum in within ten to fifteen minutes, but under the influence of this drug there is a tonic spasm of the muscular fibres about the pylorus which prevents the stomach's contents from passing into the duodenum, at times for several hours. The hydrochloric acid is at first diminished, but it is later markedly increased. Both effects are ascribed to central influences in the medulla.—*Centralblatt für innere Medicin*, 1901, No. 2, S. 72.

Chloretone.—DR. E. IMPENS has made a most thorough study of this comparatively new hypnotic, which is produced by the action of acetone on chloroform. It may be termed a tri-chlor butyl-alcohol. It is naturally compared with chloral hydrate. After a long series of animal experiments the author shows that chloretone is two and one-half times as toxic as chloral hydrate ; in small doses it has little action on respiration, but does diminish the inspiratory incursion. In large doses it reduces the respiratory effort at least 40 per cent., and the volume of respiration at least 60 per cent. It, therefore, diminishes pulmonary ventilation very markedly. Chloretone paralyzes the vasomotor centres and thereby induces marked dilatation of the

capillaries. There is a marked decrease in blood-pressure, at times as much as 43 per cent. This reduction is not alone due to its action on the blood-vessels, but it paralyzes the heart also. This toxic action is pronounced in doses sufficiently large to induce narcosis. Sleep is accompanied with lowering of the temperature, which is due at least in part to protoplasm paralysis. In one point alone does it prove more valuable than chloral hydrate, in that it is less irritable by reason of a slight analgesic action. He concludes by stating that chloretone is an extremely dangerous narcotic, much more dangerous than chloral hydrate.—*Archives Internationelles de Pharmacie*, 1901, No. 8, p. 77.

[This report is entirely at variance with clinical observation, which shows that chloretone in amount many times greater than the fatal dose of chloral hydrate merely produces profound sleep.—R. W. W.]

Colloidal Silver as a Specific.—Dr. P. VIETT advocates the use of colloidal silver as an efficient means of combating sepsis. He reports a number of illustrative cases, all resulting favorably. Should his results be substantiated, a distinct advance step in therapeutics can be recorded. He has used the unguentum Credè in larger doses than those usually prescribed (forty-five grains), using it in one inunction. In patients suffering from phlegmon, lymphangitis, and lymphadenitis his results were excellent. In one case of pneumonia inunctions over the chest were employed. The patient recovered promptly, but no special credit is given to the therapy, save that recovery began almost immediately after the use of the remedy. In two severe toxæmic cases of scarlet fever and in one of diphtheria favorable results followed promptly after the introduction of the treatment. The results were equally striking in two patients suffering apparently from acute appendicitis. Three patients suffering from puerperal sepsis recovered.

From his experience in the twenty cases reported the author is led to believe that as an effective agent against various pyogenic organisms colloidal silver should be regarded as taking first place, and that the results are certainly encouraging that an internal antiseptic has been made practicable. —*Allgemeine medicinische Central-Zeitung*, 1901, Nos. 19 and 20, S. 61 and 73.

Petroleum and the Treatment of Acute Articular Rheumatism.—Dr. HECTOR SARAFIDIS makes a careful study of the action of petroleum administered by massage in acute articular rheumatism. The remedy has a large use among the laity in oil-producing countries of Europe as well as here. The author, however, has made systematic observations with a view to determine its real value. As a result of its use by massage, ten minute *séances* once or twice a day, he concludes that the treatment of this disease by petroleum is one of the best modes of treatment known to him for several reasons. Its cheapness makes it universally applicable, at home and abroad, in touch with a pharmacy or not; it is not necessary to drug the patient; the petroleum alone will bring about a cure. It lowers the temperature very shortly. Its action is probably due to its action on the nerve filaments in the nervous membranes of the joints as well as a penetrating antiseptic effect. Complications of the endocardium were not recorded by the author. A further advantage is that it may be used in rheumatism accompanied by

Bright's disease, in which condition the salicylates are contraindicated.—
Revue de Thérapeutique, 1901, vol. lxviii., p. 73.

Preventive Treatment of Hepatic Colic.—DR. CHAUFFARD outlines the
indications for the prophylactic treatment of biliary calculi. The most
important remedy is sodium salicylate. The work of Stadelmann, Doyen,
and Dufour has shown that it is a powerful and persistent hepatic stimulant,
non-toxic to the liver parenchyma, save in immense doses; and it thereby
renders the biliary secretions more abundant, more fluid, and less liable to
deposit calculi. In addition it is an excellent antiseptic, being especially
valuable in mild infections of the gall-bladder, which are now held to be
accountable for most of the calculi formation. The doses should be mod-
erate, not over fifteen to thirty grains a day, preferably divided equally in
three to six doses at meal times. Sodium benzoate may be combined with
salicylate, in equal doses, but it is less energetic.—*La Semaine Médicale*,
1901, No. 1, p. 1.

On Tetranitrol.—DR. M. HUCHARD, in a short résumé of his work on
erythrol tetranitrate, speaks of this remedy as of much importance. He
believes that in the early arterio-sclerotic changes, the presclerotic period,
in the absence of pathological alterations, characterized by simple increase
in tension, it is of great value. In confirmed arterio-sclerosis, in coronary
angina, and in hyperdilatation of the heart from peripheral vascular con-
striction; in uric acid dyscrasia, in gout, in tabetic crises, and in intersti-
tial nephritis this remedy is indicated. It has the great advantage of mild
prolonged action. It commences to act in from fifteen minutes to three-
quarters of an hour, and if continued in one to two-grain doses, four or five
times a day, it keeps the bloodvessels in a state of reduced tension. It
further avoids the disagreeable effects on the hæmoglobin induced by others
of the nitrite group. The author has employed it in some one hundred and
twenty patients during the past four years, and has found it singularly free
from the unpleasant effects of nitroglycerin, such as pulsating temporals,
etc. Mannitol nitrite has given similar results, quercite penta-nitrite also,
hydroxylamine, a closely related body, is too irritating to the gastric mucosa.
—*Bulletin de l'Académie de Médecine*, 1901, vol. lxv., p. 288.

[Personal observation shows that it is the most valuable of all the vaso-
dilators for constant use. The apothecaries should use great care in dispens-
ing else serious accidents may occur.—R. W. W.]

Obesity and its Treatment.—DR. STREBEL, in addition to the well-
known dietary prescriptions, contributes some interesting details to the
treatment of this obstinate condition. He adds the electric light bath to
the usual procedures. Hot air baths constitute one of the best means of
keeping the condition in check, but it is only too frequent that præcordial
distress, palpitations, syncope, and vomiting are induced by this means;
certain patients with heart trouble cannot take such baths. For such espe-
cially are the electric light baths available. Among the gymnastic exercises
advised by the author is the familiar one of resting on one's back and com-
ing to the sitting posture. This should be done regularly ten to twenty

times at a *séance*, once or twice a day, on rising and retiring. As a cardiac tonic he recommends camphor, preferably in oil used hypodermatically. The electric light *séances* are to be carried out twice a week. After an exposure of twenty minutes to an arc light the neck is enveloped in cold compresses and after the *séance* a bathing at a temperature of 86° F., followed by five minutes at 64° F., then massage and friction.—*Deutsche medicinische Zeitung*, 1901, No. 3, S. 28.

Antipyrine in Rheumatism.—At a recent meeting of the Société de Thérapeutique, Paris, M. LINOSSIER reported on the use of the newer aromatic synthetics in rheumatism. He believes that in doses of forty-five to sixty grains a day the results are identical with those obtained from the salicylates, and the disagreeable effects much less. He further thought that antipyrine had a distinct effect in diminishing the tendency to pericarditis, endocarditis, and other cardiac complications.—*Revue de Thérapeutique*, 1901, vol. lxviii., p. 151.

Dymal.—DR. L. KOPP has made some studies on a new compound—didymium salicylate—which has been termed dymal. It is an impalpable powder, without odor or taste, and is best prescribed in the form of an ointment. In deep ulcers of the leg, cutaneous gangrene, and in burns, even of the third degree, it has proved of value. Its action as an antiseptic is demonstrated also in a variety of infected wounds. It is of value, in the author's hands, in eczema, in psoriasis, in hyperidrosis, in ichthyosis, and in pruritus. Its comparative inexpensiveness gives it an advantage over some of the newer products used for the same purpose. It is a chemical by-product.—*Therapeutische Monatshefte*, 1901, Heft 2, S. 127.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,
PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Induced Labor, Symphysiotomy, and Embryotomy.—In the *Monatsschrift für Geburtshülfe und Gynäkologie*, 1900, Band xii., Heft 5, GROSS reports the case of a multipara whose first labor was terminated by embryotomy and whose second pregnancy was ended by induced labor. In the third pregnancy labor was induced, and the head descended partially into the pelvic brim, but came no further, the occiput rotating toward the promontory of the sacrum, with a large caput succedaneum developing. Symphysiotomy was performed and the forceps applied to the head. It was impossible to deliver the head, and craniotomy was accordingly done. The head was

found excessively hard, the sutures and fontanelles almost closed.   The mother made a good recovery.

The pelvis in this case was considerably flattened, the external conjugate being 17 cm.   As the patient was a multipara, the birth-canal, aside from the bony pelvis, was in a favorable condition for the delivery of the child. The choice of symphysiotomy, however, was unfortunate in view of the degree of pelvic contraction and the excessive comparative size and hardness of the head.   The writer has collected three other cases from the literature in which symphysiotomy and the use of forceps failed to deliver the child, and in which embryotomy was performed in addition.

[In our experience, symphysiotomy is adapted to cases of slight disproportion only between the head and the pelvis.   In well-marked disproportion the chances of foetal death are too great to warrant the selection of the operation.]

The Importance of Bacteria in the Vagina as a Source of Puerperal Infection.—In the *Zeitschrift für Geburtshülfe und Gynäkologie*, 1900, Band xliv., Heft 1, STICHER contributes an interesting paper upon this subject. Reasoning from the anatomy of the vagina and the character of the tissues surrounding it, Sticher became convinced that bacteria from the skin or clothing must necessarily find access to this portion of the body.   Water used in bathing must also be a possible source of contamination.

To determine the latter he caused patients to bathe in water containing cultures of bacteria, and afterward proved the presence of these germs in the vagina by inoculation tests with vaginal secretion.

While it is true that we cannot hope to exclude all bacteria from the birthcanal, we may find a rational explanation in clinical freedom from infection in the condition of the mucous membrane.   So long as this is not bruised, lacerated, and rendered œdematous by frequent violent manipulation during labor, or by long-continued birth, bacteria found in the vagina are rarely the cause of infection.   We can control by antisepsis the introduction of virulent germs by hands and instruments, and if we avoid injury to the mucous membrane of the birth-canal during delivery, and especially if we avoid the œdema which follows long-continued pressure from delayed labor, we shall do much to prevent serious infection.

The Advantages of Induced Labor.—In the *Centralblatt für Gynäkologie*, 1900, No. 17, GRUSDEW reports the case of a patient with a flat pelvis who had been pregnant nine times.   By the induction of labor she had five living and healthy children and remained herself in good health.   She came under his observation in the ninth month of pregnancy.   At eight months' gestation and by the use of the bougie and elastic bags he was enabled to bring on a spontaneous labor, from which the mother and child made a good recovery. He cites his case in opposition to statistics which exaggerate the danger of induced labor.

[When the contour of the pelvis is considered it is found that the pelvis was flattened only in one diameter, and that its oblique diameters were ample. There is no mention made of the relative stature of the parent, and the reason for the induction of labor seems to be the pelvic contraction only.

In our experience, cases like the one reported are most successful for the induction of labor. If the oblique diameters are of good size it is almost invariably possible to bring an eight months' fœtus safely through such a pelvis. Where, however, the pelvis is symmetrically contracted or is markedly rhachitic, with irregular contraction, the chances for the survival of the fœtus are very greatly diminished.—ED.]

Pregnancy and Labor in a Patient who had Previously Suffered from Rupture of the Uterus.—In the *Monatsschrift für Geburtshülfe und Gynäkologie*, 1900, Band xii., Heft 1, p. 115, STROGANOW reports the case of a woman, aged twenty-six years, who was brought into the hospital in her fifth labor with symptoms of rupture of the womb. She was anæsthetized, a dead child extracted by forceps, and the after-birth removed. A complete rupture was found on the anterior wall of the uterus, extending into the lower uterine segment. Abdominal section was performed because of the continuous hemorrhage. It was found that the laceration began at the left round ligament and extended toward the right side to the ligament of the right side. The rent was closed by sutures and the abdomen closed. The patient made a good recovery and left the hospital.

A year afterward she presented herself at the end of her sixth pregnancy, the fœtus occupying the second position, the vertex presenting. Labor did not proceed actively, and was accordingly induced by the introduction of a bougie, followed by a tampon of iodoform gauze. The child presented by the breech and the cord prolapsed, so that the extraction of the child was necessary. On examining the uterus the site of the previous laceration was found thickened, and the stitches of the previous closure could be felt. On the third day one of the stitches was projecting into the uterine cavity; two days later it was removed. The patient made a good recovery and was discharged from the hospital, the pelvic organs being in a nearly normal condition.

The Treatment of Pernicious Nausea of Pregnancy by Therapeutic Abortion.—In *L'Obsétrique*, 1900, p. 230, MERLE contributes a paper upon this subject, in which he strongly advocates the instrumental emptying of the uterus in cases of pernicious nausea in which the patient's strength steadily fails.

He would give chloroform to obstetric anæsthesia, and, under antiseptic precautions, grasping the cervix with tenaculum forceps, he would dilate the uterus with solid dilators, and with the fingers remove the ovum. He would then wash out the uterus with a solution of bichloride of mercury and tampon it with iodoform gauze. He would cleanse the uterus with an instrument, somewhat resembling a brush, dipped in a solution of bichloride or a glycerin and creosote mixture.

[While we heartily agree with Merle in his decision to operate promptly so soon as the patient's strength fails, our method of performing this operation differs somewhat from his. After dilating the uterus with solid dilators we employ the douche curette, using normal salt solution, thoroughly sterile, or lysol, 1 per cent. We have endeavored to empty the uterus with the finger, but did not find the finger long enough to accomplish the purpose

thoroughly. After the uterus is emptied and douched it is tamponed with iodoform gauze. In our experience this procedure inevitably cures the nausea. It does not, however, arrest the progressive weakness which destroys the lives of so many of these patients.—ED.]

The Diagnosis of Early Ectopic Gestation with Reference to Menstruation.—In the *Archiv für Gynäkologie*, 1900, Band lxi., Heft 3, WEINDLER contributes an interesting paper upon this subject, in which he gives the results of his study of fifty cases of ectopic gestation. In each of these patients the history of menstruation was carefully obtained and the curve of each case drawn with reference to this factor.

Out of the 50 cases during the first month of ectopic gestation there were 18 tubal abortions and 1 rupture; in the second month of ectopic gestation 15 tubal abortions and 2 ruptures; in the third month 7 abortions and 3 ruptures, and in the fourth month 2 abortions. The remaining cases were those of pregnancy in a rudimentary cornu of the uterus. From these investigations the early interruption of ectopic pregnancy occurs most frequently as a tubal abortion, which is more common than rupture of the gravid tube, and this occurs most frequently during the first two months of ectopic pregnancy. A most probable cause for this condition lies in the fact that some pre-existing disease of the uterus, tubes, or ovaries is present in these cases, making it impossible for the gestation to proceed further.

In studying these cases the menstrual curve of the first months gives information of value. In eighteen cases where ectopic gestation was observed during the first month menstruation came on at the usual and regular time, but with increased bleeding. In other cases menstruation was slightly delayed and of increased intensity.

It is of interest to observe that in many cases in which ectopic gestation lasts longer than the first month menstruation occurs in almost normal manner. In these cases the diagnosis must be made without reference to menstruation by the detection of a tumor and the characteristic pain.

In cases where the ectopic gestation goes to the second, third, and fourth month there is disordered menstruation, usually amenorrhœa, until the time when rupture of the fœtal sac occurs, and profuse internal hemorrhage.

To summarize, menstruation is altered in early ectopic gestation as follows: Where ectopic gestation terminates in the first month it does so by a profuse hemorrhage at the time of menstruation at the end of the first month of gestation.

When the gestation goes on uninterrupted to the second or third month menstruation may be unaltered. Tubal abortion is not uncommon, and hemorrhage may occur at any time.

Where ectopic gestation persists to the third or fourth month menstruation may cease, no hemorrhage occurring until the rupture of the gestation sac.

Vaginal Cæsarean Section in the Treatment of Eclampsia.—DÜHRSSEN (*Archiv für Gynäkologie*, 1900, Band lxi., Heft 3) adds another to his cases of vaginal Cæsarean section, the operation being performed in this instance for eclampsia. The patient was a primipara, aged thirty-one years, with a

family history of pulmonary tuberculosis. She was between six and seven months advanced in pregnancy when eclampsia developed. On admission to the hospital the patient was a stout, fat woman, with œdema of the legs, abdominal wall, and labia, and dusky face. The pulse was strong and rapid and the breathing stertorous. The patient was completely unconscious, but had slight reflexes. The urine was highly albuminous; the fundus of the uterus was at the umbilicus; the child was in the transverse position, the right shoulder presenting, and the cervix was intact, but admitted one finger. The walls of the cervical canal were very rigid; the patient was having no labor pains.

As soon as possible she was delivered by vaginal Cæsarean section under chloroform. The operation consisted in inserting a wide, single-bladed speculum, which depressed the posterior vaginal wall. The cervix was grasped with two tenaculum forceps and drawn downward. The anterior vaginal wall was freed from its attachment to the cervix by a transverse incision made with scissors. The cervix was divided in the median line to the inner os. Two additional tenaculum forceps were then inserted to grasp the borders of the cervical wound, and the fascia and vaginal walls were joined to the cervix with two catgut stitches. The cervical incision was then continued upward through the lower uterine segment, when the fœtal membranes prolapsed and appeared in view. The speculum was then removed, and the tenaculum forceps grasping the cervix, combined version was performed, a foot being brought down and the child extracted. The delivery of the head occasioned some difficulty, and it was necessary to prolong the incision in the uterus for this reason. The placenta and membranes were readily removed by the finger and the uterus tamponed with iodoform gauze. The wound in the uterus was closed with six catgut stitches, while the external portion of the cervix was not brought together lest undue contraction should occur.

At this point free hemorrhage from the uterus began, accompanied by the contraction of the uterine muscle and the partial expulsion of the gauze tampon. The anterior blade of a speculum was inserted into the uterus and the uterus firmly tamponed with gauze, when the bleeding immediately ceased. The stitches were then tied and the transverse incision closed with catgut. A small strand of gauze was left to drain the space between the uterus and bladder. The vagina was then tamponed with cotton and a slight laceration in the perineum repaired. The entire loss was not greater than in a normal labor. The child lived an hour and a half, its measurements corresponding with those of the twenty-seventh week of gestation. The patient had no more eclampsia, and slowly improved. She developed a catarrhal pneumonia, probably of tubercular origin.

The wounds made by operation healed by first intention. The uterus was but slightly enlarged, anteflexed, and without discharge. The patient subsequently developed nephritis, and died of heart-failure some time after her discharge from the hospital.

We are indebted to Dührssen for his method of rapid delivery by free incision in the cervix, accompanied, if necessary, by a central incision of the pelvic floor and perineum. He is especially interested in the development of vaginal Cæsarean section, and believes that the field of this operation

embraces those cases where the obstacle to labor lies in the muscular tissues of the birth-canal, with danger to the mother and child through lack of dilatation in the cervix. In cases of carcinoma of the neck of the womb he recommends this operation, followed immediately by vaginal extirpation of the uterus. His experience embraces up to the present time twenty-two operations of this kind, of which sixteen were performed for carcinoma of the cervix complicating pregnancy, two for eclampsia, two for stenosis of the cervix, one for uncontrollable vomiting, with polyhydramnios and stenosis of the cervix by scar-tissue, and one from fatal disease of the heart in a moribund patient. Of these sixteen, three died, and in each of these cases no complication occurred with the operation, the patient perishing from the disease which originally threatened her.

[It is evident that this mode of delivery must be limited to those cases in which the bony pelvis is sufficiently large to allow the child to pass readily. With these restrictions the operation seems to have a field of decided usefulness.]

GYNECOLOGY.

UNDER THE CHARGE OF

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Reproduction of Uterine Fibroids.—DOLÉRIS (*La Gynécologie*, 1900, No. 12) reports four cases of myomectomy in which small fibrous nodules which were regarded as insignificant at the time of operation subsequently developed to such an extent as to require removal. In view of his experience in these and similar cases, the writer has decided to remove only pedunculated tumors or those which are easily accessible, where the uterus appears to be of normal size. He thinks that the dangers of hemorrhage and sepsis have been underrated. In future the indications for myomectomy will be limited.

Transplantation of the Ovary.—MAUCLAIRE (*La Gynécologie*, 1900, No. 12) reports seven cases of subcutaneous transplantation, and reviews the literature quite thoroughly. In four cases the grafted ovary became infected and was removed a few days later. In the three others it could be felt three months after operation. He concludes that the ovary can be successfully transplanted both from the same and from a different individual, provided that it be absolutely aseptic.

Disturbances of menstruation and troubles following single or double oöphorectomy may be relieved in this way. If it is not deemed advisable to leave the ovary within the abdominal cavity, subcutaneous implantation may be tried, but never in cases in which infection is suspected. If there is a rise of temperature within twenty-four hours after operation, the ovary should be promptly removed.

Appendicitis and Disease of the Adnexa.—DELAGÉNIÈRE (*La Gynécologie*, 1900, No. 12) reports twenty-six cases of appendicitis associated with diseased adnexa, only four of which were acute. He believes that the inflammation of the appendix is usually secondary to its attachment by adhesions, thrown out in consequence of disease of the right tube and ovary. The interference with the circulation of the appendix renders it peculiarly liable to become inflamed. The type of inflammation is usually subacute or chronic. This explanation does not apply to all cases, since in some it is clear that appendicitis was the primary condition, the adnexa being infected through the lymphatics in the adhesions. As regards the symptoms, in cases of appendicitis secondary to disease of the adnexa there is usually a history of former uterine or tubo-ovarian trouble, while the intestinal symptoms are less striking than in a case of primary appendicitis. The attack is apt to correspond with the beginning of the menstrual period, while in disease of the tube and ovary it reaches its greatest severity toward the end. In suppurative appendicitis the pain is more severe, but it may extend below McBurney's point into the painful zone of adnexal disease. In non-inflammatory affections the diagnosis is less difficult.

The writer prefers a long median incision, even in cases of suppurative appendicitis complicating disease of the tubes and ovaries, since it may be advisable to remove the uterus. The appendicial abscess can be protected with gauze and the cavity drained through a counter-opening in the loin.

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Fibroma of the Vagina.—GRUZDER (*Wratch*, 1900, Nos. 8 to 10) reports three cases and analyzes eighty-five which he has collected from the literature. Twenty-five patients were nulliparæ. The youngest was fifteen months and the oldest seventy-one years. The anterior vaginal wall was most often affected, the tumor usually developing from the submucous layer. These neoplasms are usually fibromata, and are rich in blood- and lymph-vessels, hence the frequent occurrence of interstitial hemorrhage and suppuration. They are usually encapsulated. They grow slowly and rarely reach a considerable size, the largest recorded being ten pounds.

The symptoms due to these growths are largely mechanical, varying with their size. They are most apt to be mistaken for cysts, the diagnosis being made by explorative puncture. Interstitial fibromata are difficult to distinguish from similar growths in the lower uterine segment, dermoids anterior to the uterus, and echinococcus cysts of the pelvic connective tissue. Tumors in the vaginal wall as they enlarge tend to encroach upon the canal, which is not true with paravaginal neoplasms. Pedunculated sarcomata would only be recognized on microscopical examination unless they cause constitutional symptoms. While the prognosis is usually favorable, these growths may suppurate or undergo malignant degeneration, while if they attain a large size they may cause dystocia.

The removal of polypoid tumors is simple, but the enucleation of interstitial fibromata may be quite difficult and attended with hemorrhage and suppuration.

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Uterine Calculi.—RATHINSKY (*Wratch*, 1900, No. 2) reports three cases in which the uterus contained one or more calculi varying in size from a pea

to a walnut. In one post-mortem specimen the fundus uteri had been perforated by a sharp angle of a calculus. These bodies were composed of phosphate and carbonate of lime, which were dissolved by muriatic acid, leaving traces of connective tissue in a state of hyalin degeneration. The writer regards them as simple calcified uterine fibromata. As regards the treatment, when the bodies are small they may be removed per vaginam after dilating the cervix; when they are of large size it may be necessary to perform vaginal or abdominal section according to their situation.

Endothelioma of the Uterus.—POHORECKY (*Archiv für Gynäkologie*, Band lx., Heft 2) adds a fifth case to the four already described. The growth was discovered in a patient, aged forty-three years, being situated in the posterior lip of the cervix and bleeding freely after coitus. It was composed of a fibrous stroma, with alveoli filled with polygonal cells of an epithelial type. These cells were also distributed irregularly throughout the stroma. Lymph-spaces were observed, the cells of which seemed to have no relation to those in the interspaces or alveoli. At the base of the tumor were observed small nodules of a similar structure, which were evidently outlying foci of disease. It was evident, also, that the neoplastic cells were carried through the lymph-channels.

Treatment of Vesicovaginal Fistula.—SPASSOKONKOZKY (*Centralblatt für Gynäkologie*, 1900, No. 25) describes the following method of closing a fistula: Several sutures are passed between the vaginal and vesical mucosa. While traction is made upon these a bistoury is introduced between the sutures and the vaginal mucous membrane and a flap is dissected off. The sutures are then threaded in the eye of a catheter and are drawn through the urethra and out at the meatus. The vesical flap is thus inverted into the bladder, while the vaginal edges of the fistula are easily approximated, after which the temporary sutures are withdrawn per urethram. This method was employed successfully in five cases.

VEBER (*Wratch*, 1900, No. 28) describes a complicated case of fistula resulting from gangrene of the vagina, in which, after two failures, he succeeded in closing the fistula by taking skin-grafts from the inner surface of the thigh.

VITRAL (*La Gynécologie*, 1900, No. 6) found by experiments that the ventral decubitus is most favorable not only for the spontaneous healing of small vesicovaginal fistulæ, but in order to insure success after operation. As the position is not a natural one, the patient should become accustomed to it before operation.

Uterine Fibrocyst of Unusual Size.—KNAUER (*Centralblatt für Gynäkologie*, 1900, No. 48) reports the case of a patient, aged forty-eight years, with an abdominal enlargement of six years' standing, which had caused extreme dyspnœa, rapid heart-action (pulse 160), and rapid emaciation. On auscultation a loud heart-murmur and general bronchial râles were heard. The abdomen was enormously enlarged, measuring sixty inches in its greatest circumference. The tumor was fluctuating, and a diagnosis of probable ovarian cystoma was made.

On account of the condition of the patient the operation was performed under cocaine anæsthesia (Schleich's method of infiltration). On tapping the cyst twenty litres of bland fluid escaped. The growth was intraligamentary and was removed in pieces, profuse hemorrhage resulting. The right ureter was dissected off for a space of four inches. The sac was stitched into the abdominal wound and drained. The patient made a rapid recovery. Histologically the neoplasm proved to be a cystic fibromyoma, and although it had no connection with the uterus it was inferred that it had probably originally developed from that organ, the pedicle having become separated. The solid portion weighed eleven pounds, so that it was estimated that its entire weight was fifty-five pounds.

Formal in the Treatment of Uterine Hemorrhage.—GERSTENBERG (*Centralblatt für Gynäkologie*, 1900, No. 34) reports a series of cases in which he applied concentrated formal within the uterine cavity. A 40 per cent. solution of formaldehyde was introduced on an applicator without causing pain or other bad effects. The patient was kept in bed for two days. It may be necessary to repeat it once or twice. This treatment is especially useful in climacteric hemorrhages, or where curettement is contraindicated.

Intestinal Obstruction after Vaginal Section.—GERSUNY (*Centralblatt für Gynäkologie*, 1901, No. 48), commenting upon a case of ileus following vaginal hysterectomy, affirms that while it is desirable in cases in which gauze drainage is used that the bowels should not be moved until the infected area has been walled off by exudate, in simple cases, on the contrary, the opposite plan should be adopted. Even when the intestine has been sutured peristaltic movements can be induced before the third day by rectal impaction without endangering the wound. He allows his patients to drink freely and relieves flatus by glycerin injections, employing high enemata only when these fail.

Changes in the Endometrium in Connection with Fibroids.—PEHAM (*Centralblatt für Gynäkologie*, 1901, No. 48) describes a case of extreme hyperplasia of the endometrium in a fibroid uterus. The mucosa measured an inch in thickness and under the microscope showed marked glandular hypertrophy, their lumina being dilated so as to form large cavities lined with cylindrical epithelium. Many cysts were observed, filled with débris, the lining cells being flattened by pressure. When divided in their long axes they appeared tortuous and corresponded in length to the entire thickness of the mucosa. As the epithelial cells were entirely normal in their appearance and arrangement, there was no reason to infer the development of any malignant degeneration.

Torsion of the Fallopian Tubes.—VAN DER BERG (" Dissertation," abstract in *Centralblatt für Gynäkologie*, 1901, No. 48) reports a case of torsion of a pyosalpinx, with complete separation of the tumor, which he believes to be unique ; also a similar case of hydrosalpinx, and another in which the tube was completely separated from an ovarian cyst as the result of torsion. He collected from the literature thirty-six cases, distributed as follows : hydro-

salpinx, 23; pyosalpinx, 5; neoplasms of the tube, 5; complete separation
of the tube as the result of torsion, 3. He believes that while in the case of
the larger tubal sacs torsion is due to the same causes as in ovarian tumors,
in that of the smaller enlargements some other etiological factor must be
sought, possibly the persistence of the infantile type, predisposing to inflam-
mation. In these cases there may be a tendency to torsion from the begin-
ning, which is favored by early closure of the uterine end.

The writer thinks that torsion of the tube occurs more frequently than
is ordinarily supposed; in fact, that it is probable that this is a common
cause of hydrosalpinx and of hæmatosalpinx not due to atresia of the genital
tract. The attacks of colicky pain often noted in connection with these con-
ditions may be thus explained. The importance of torsion in ectopic gesta-
tion is evident, since it may lead to rupture.

Torsion of the Pedicle and Uterus in Ovarian Cysts.—SONNENFELD
("Dissertation," abstract in *Centralblatt für Gynäkologie*, 1901, No. 48) found
marked torsion of the pedicle in 50 out of 323 cases of ovarian cystoma (15
per cent.). No cases are included in which there was not obstruction of the
circulation or torsion to 180° and more. Dermoids seemed to predominate.
In two cases the uterus was twisted about its long axis to 180°.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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AND

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Toxic Amblyopia from Jamaica Ginger or Methyl Alcohol.—J. DUNN
(Richmond) reports two of these cases in which a debauch, including the
drinking of a large quantity of "essence" of Jamaica ginger, terminated in
blindness. The cases resembled others of the kind previously reported.
They were seen late, giving a history of very rapid loss of sight, followed
by some improvement, and, later, by further impairment of vision. The
optic nerves gave evidence of atrophy probably consecutive to neuritis.—
Virginia Medical Semi-Monthly, January 25, 1900.

E. STIEREN (Pittsburg) reports the case of a man who, after drinking
heavily on Saturday, got a dozen ounce-bottles of "essence" of Jamaica
ginger and consumed it before noon on Sunday. He awakened at 3 P.M.
totally blind. When seen at 6 P.M. the pupils were widely dilated and
unaffected by light and accommodation. There was slight retinal œdema
and blurring of the edge of the optic disk, and the sensibility of the cornea

was impaired. During the night the patient was given three hot foot baths, calomel, and compound jalap powder, each twenty grains, in divided doses, and two one-eighth grain doses of pilocarpin hypodermatically. Next morning he could count fingers at ten inches. The calomel and pilocarpin were continued for two days and then followed by large doses of potassium iodide. In five days vision had improved to 20/30, and subsequently became normal.— *Journal of American Medical Association*, January 5, 1901.

H. HARLAN (Baltimore) reports two cases, in which amblyopia had followed the use of " essence " of Jamaica ginger and " essence " of peppermint. The cases were seen several months after the onset, and showed atrophy of the optic nerves. One became entirely blind and in the other vision remained at 6/200 and 7/200.

Harlan ascertained what make of " essence " had been used by these patients. It was the same brand in both cases. He obtained a considerable amount of the essence of ginger and had it subjected to chemical analysis. The analysis showed that instead of being the pharmacopœia tincture of ginger, made with ethylic alcohol, it was deficient in ginger, the deficiency being covered by the use of capsicum, and the menstruum was a mixture of one part ethylic with three parts methylic or wood alcohol.— *Ophthalmic Record*, February, 1901.

[A year ago it was pointed out (*Progressive Medicine*, June, 1900) that the points of resemblance of so-called Jamaica ginger amblyopia to methyl alcohol amblyopia would justify a careful examination to determine whether this latter drug is used in the cheap essences of Jamaica ginger. The cases that have since been reported have still further illustrated the resemblance between the amblyopias ascribed to these two substances. Stieren's case, the only one of recovery after the use of essence of Jamaica ginger, naturally takes its place with Kuhnt's single case of recovery from methyl alcohol amblyopia. It should be noticed, also, that these wood alcohol " essences " investigated by Harlan were manufactured in Baltimore, and that nearly all of the cases of " Jamaica ginger amblyopia " have occurred in the territory of which Baltimore is a principal trade centre. Since methyl alcohol is known to cause amblyopia of just this kind the strong probability that all the essence of Jamaica ginger that caused this form of amblyopia consisted chiefly of wood alcohol, makes it reasonable henceforth to class all these cases as cases of methyl alcohol amblyopia.—ED.]

Quinine Amblyopia.—A. ALT (St. Louis) reports a case of quinine blindness in a woman, aged twenty-seven years. She took six grains every two hours until twenty-four grains were taken, and then four grains every two hours up to a total of forty grains. After taking eighteen grains disturbance of vision commenced. After twenty-eight grains she could barely recognize the lamp in her room. After thirty-two grains she was totally blind. In spite of this her physician next day ordered her to take forty grains more. Light perception reappeared after three days, and two months later she had regained central vision of 20/30 and 20/20 partly; but her fields of vision remained very much contracted.

In many years practice in a quinine consuming region, this is Alt's first case of unquestionable quinine blindness; but he thinks some of the cases

of optic atrophy he has previously observed might be of this character. Alt refers to a symptom not previously described in connection with quinine blindness which he himself experienced after taking sixty grains of the muriate in an hour. This is green vision, everything appearing of a bright emerald hue.—*American Journal of Ophthalmology*, January, 1901.

H. MOULTON (Fort Smith, Ark.) reports two cases coming to him as cases of optic atrophy of long standing in which the cause had not been suspected ; but upon inquiry a reliable history was obtained of the origin of the trouble. It had followed taking very large doses of quinine in early childhood, after which the patients had for a time been completely blind.—*American Journal of Ophthalmology*, February, 1901.

[The part that idiosyncrasy plays in causing quinine blindness is well recognized. Alt's case is remarkable for the smallness of the amount of quinine that caused it and for the early appearance of the symptoms. Usually the blindness comes on after all other symptoms of cinchonism have disappeared, one, two, or three days having elapsed since the ingestion of the drug. These cases, especially Alt's, illustrate a reprehensible ignorance of the toxic effects of quinine on the part of some members of the profession.—ED.]

Ophthalmia Neonatorum.—GREENOUW (Breslau) reports a study of the clinical and bacteriological aspects of this disease in 100 cases. He finds that the inflammation of the eyes in the newborn, in simple conjunctival catarrh as well as in blenorrhœa, is due to a variety of micro-organisms, among which are the gonococcus, pneumococcus, streptococcus pyogenes, colon bacillus, and yellow staphylococcus. He finds that the same patient may show in one eye a severe blenorrhœa, while in the other the gonococcus conjunctivitis may assume the appearance of a simple catarrh. In general, blenorrhœa due to the gonococcus is marked by a more copious discharge and is of longer duration than that due to other forms of bacteria. Damage to the cornea is confined to gonococcus conjunctivitis or occurs rarely in other forms. If a single careful examination before beginning treatment, or after a sufficient interval has elapsed since the application of an antiseptic fails to relieve the gonococcus in the purulent discharge, the prognosis is entirely favorable.

The discovery of the gonococcus in the discharge is a positive indication for the use of silver nitrate or some other silver preparation. In three cases presenting gonococcus blenorrhœa of equal severity in the two eyes, one eye was treated with a 2 per cent. solution of the nitrate and the other with a 5 per cent. solution of protargol, and the pus was examined each day with counts of the cells showing gonococci. The results were practically the same in each case. In one case the gonococci disappeared from the eye treated with protargol one day earlier than from the eye treated with the nitrate. In the other cases the organisms disappeared from both eyes on the same day.—*Græfe's Archiv. für Ophthalmologie*, February, 1901

[In this trial the solutions used were not so strong as are often employed, and the protargol solution may be regarded as relatively the weaker. Certainly in solutions of these strengths the protargol would be very much the less irritant, and probably it would do less damage if improperly applied.—ED.]

DERMATOLOGY.

UNDER THE CHARGE OF

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Urticaria the Result of the Use of Formalin.—GLOVER (*British Journal of Dermatology*, April, 1901) reports the case of a young married woman, who, after the application of a lotion to the hair containing formalin in bay rum, suffered from a severe urticarial eruption which appeared the day after the first application was made, and grew worse after a second application. The eruption covered practically the entire body ; the face was swollen, and great wheals were present on the trunk and extremities. It was considered that, in the absence of other possible factors, the formalin lotion was the cause of the eruption. The lotion, which still remained in the patient's room giving rise to the characteristic odor, was removed, bran baths were used, and improvement followed immediately.

A Peculiar Case of Dermographism.—FABRY (*Archiv für Dermatologie und Syphilis*, Band liv., Heft 1) reports under this title a remarkable case of chronic factitious hemorrhagic urticaria observed in a woman, aged sixty years. The affection began with the appearance of purpuric lesions in the upper eyelids and itching of the neck and breast. Scratching was followed by the appearance of hemorrhagic wheals. About a year before the death of the patient an enormous swelling of the tongue occurred which never disappeared. The pressure of the patient's clothing was sufficient to produce hemorrhagic wheals which, after lasting two to four weeks, gradually disappeared without leaving any pigmentation. These never appeared spontaneously, but were always the result of trauma. The disease lasted three years, and ended in the death of the patient from asthenia.

Lichen Ruber Pemphigoides.—BETTMANN (*Dermatologische Zeitschrift*, 1901, Band viii., Heft 1), after referring to the cases of lichen ruber reported by various authors in which bullæ were present, reports at some length a new case of his own, and discusses the following questions : 1. Do the cases of lichen ruber in which bullæ form represent a special atypical variety of the disease ? 2. Is the formation of bullæ a consequence of the administration of arsenic rather than the disease itself ? 3. Have we to do, in these cases, with a combination of lichen and pemphigus—*i. e.*, a combination of two different diseases ? The author believes that, while in some of the reported cases the bullous eruption was most likely due to the use of arsenic, in others it represented a special variety of the affection. He does

not believe that these cases should be regarded as an accidental combination of two different diseases.

Psoriasis of Bullous and Rupioid Appearance. — HALLOPEAU and LEMIERRE (*Annales de Dermatologie et de Syphiligraphie*, 1901, No. 1) at a *séance* of the Société Française de Dermatologie et de Syphiligraphie exhibited a man, aged forty-seven years, with an extensive psoriasis, in whom one of the patches of eruption presented an unusual aspect. The lesions upon the trunk and upper extremities were of the ordinary type, but those upon the legs were covered with extremely thick, yellowish, hard, almost horny scales. These thick, slightly convex scales were surrounded by a ring of white epidermis which was apparently elevated by exudation underneath it. On removing this ring of epidermis, however, no fluid was found, but a whitish pasty material, which was composed of epidermic cells more or less degenerated with a few leucocytes.

Peruol in Scabies. — SACHS (*Deutsche med. Wochenschrift*, 1900, No. 39; *Dermatologische Zeitschrift*, Band viii., Heft 1) treated thirty-five cases of scabies successfully in the Breslau clinic with peruol. This substance, which represents the most active element in balsam of Peru, is a clear, odorless oil which does not irritate the skin nor soil the clothing, but is fatal to the itch-mite. After a bath (with soap, if the skin was not too much inflamed) the oil, diluted with three parts of castor oil, was vigorously rubbed in three or four times.

On Ringworm Infection in Man and Animals. — J. L. BUNCH (*British Medical Journal*, February 9, 1901) describes eight cases in which the fungus was derived from animals of various kinds ; but it must not be supposed that this form of ringworm is common, because the author examined many animals which, though believed to be suffering from ringworm, really had other diseases. Valuable though microscopical examination is in enabling a diagnosis to be made, greater reliance must be placed upon cultures, which either confirm the conclusions derived from the microscope or serve to differentiate those cases in which otherwise a differential diagnosis could not be made. Cultures soon clear up the diagnosis. In cases, for example, where the spores are so closely packed that their shape necessarily appears round, the microscope is quite unable to distinguish between microsporon and ectothrix.

Trophic Disturbances in the Mammary Region Produced by the X-rays. — BARTHELEMY (*Annales de Dermatologie et de Syphiligraphie*, 1901, No. 2) at a recent *séance* of the Société Française de Dermatologie et de Syphiligraphie presented a patient, a woman, who had been treated by exposure to the X-rays for pain in the mammary region resulting from a blow. During this treatment, which lasted four months, the rays had not produced the slightest redness of the skin. At first the epidermis in the left mammary region became strongly pigmented over an area as large as two hands, and this was followed by sharp itching. Six months later superficial desquamation appeared in places, the epidermis coming off in large strips, as the hands desquamate

after scarlatina. The skin was thick, white over a considerable area, with red or violaceous zones here and there. Emphasis was laid upon the fact that the cutaneous lesions had first appeared five months after the last exposure to the rays.

Melanodermia with Cachexia and Pigmentation of the Buccal Mucous Membrane Due to Pediculosis Corporis.—CHATIN (*Annales de Dermatologie et de Syphiligraphie*, No.12, 1900) reports the case of a man, aged seventy-eight years, who, in consequence of a severe pediculosis corporis, presented an intense pigmentation of the covered portions of the body with numerous slate-colored spots on the mucous membranes of the cheeks. The patient had also suffered from cough accompanied by great feebleness and emaciation for two months, and it was at first thought that he might be suffering from Addison's disease, but after a stay of three months in the hospital he lost his cachectic appearance, the melanodermia cleared up, and the pigmentation of the mucous membrane of the cheeks completely disappeared. The author briefly reviews the cases previously reported—nine in number.

Alopecia Areata.—O. LASSAR (*Dermatologische Zeitschrift*, September, 1900, p. 809), in considering the etiology of this disease, thinks that the irregularity of the manifestation, its sudden advent, the absence of symmetry, the generalization over all hairy regions, and the absence of other symptoms of disease of the peripheral nerves, render the trophoneuritic theory improbable. He thinks there is evidence of contagion and infection, but that the bacteriological theory still requires to be confirmed. The treatment usually adopted by him is antiseptic. The scalp is washed daily with a strong tar soap and treated then with a 2 per cent. corrosive sublimate solution, afterward with absolute alcohol with ½ per cent. naphthol, and, lastly, with 2 per cent. salicylic acid in oil. The galvanic treatment has not proved valuable in his hands. He recognizes only one variety of the disease.

Treatment of Rodent Ulcer by the X-ray.—J. H. SEQUEIRA (*British Medical Journal*, February 9, 1901) makes a report based on twelve cases, illustrated with several photographs. Of the twelve cases eight were still under treatment, and four were under observation, ten ulcers having healed. The cases were deemed to be unsuitable for surgical treatment. In one very severe case the patient could not bear the pressure of the special apparatus which is used in the Finsen method to render the parts under treatment anæmic. The current used was one of from three to four amperes. The coil was one producing a ten-inch spark, and the tube was placed about six inches from the ulcer, the adjacent parts of the skin being protected by a layer of lead-foil. The treatment lasted ten minutes, and was repeated daily. At the end of a week the ulcer was clearer and somewhat shallower. A month later the improvement was remarkable. In the course of another month the ulcer had almost entirely healed. An excised piece of tissue from the healed border showed it to be made up largely of connective tissue.

Pigmentation of the Skin from Drinking Beer Containing Arsenic; Peripheral Neuritis.—GALE and HALLAM (*Medical Press*, February 27, 1901,

p. 226) report eight cases of peripheral neuritis accompanied by pigmentation of the skin occurring among beer drinkers; the average amount of beer daily was three pints; six of the cases were women, two men. The illness began with digestive disorders, numbness and tingling sensations in the hands and feet, soon followed by loss of power in the arms and legs. All the cases presented the following signs: 1. Varying degrees of peripheral neuritis up to complete loss of power. 2. Brown pigmentation of the skin all over the body, most marked on the abdomen and chest, with, later, desquamation of the pigmented skin. 3. Thick desquamation of skin and redness of palms and soles. 4. The mental state was good in all but one case, a known alcoholic. Analysis showed the beer to contain arsenic in dangerous quantity.

Finsen's Light Treatment of Lupus and Rodent Ulcer.—MORRIS and DORE (*British Medical Journal*, February 9, 1901) present a lengthy and valuable article on this subject, the result of experimental work, concluding that although they cannot as yet make any definite statements as to permanent cure, the results attained have fully justified their expectations, and that they are of opinion that in these diseases better and more permanent results in the way of cure are to be obtained than in any other forms of treatment hitherto employed. In their experiments electric light instead of sunlight was used. A current of seventy-five amperes and about sixty volts was sufficient to produce a good reaction in the majority of the cases. All depends upon the reaction, this depending upon many factors, such as the focus being exact, the size of the focus, the clearness of the water and lenses, the quality of the carbons, etc. Reaction occurs in from five to twenty-four hours, is usually slight for the first few days of treatment, then becoming more marked, increasing rather than diminishing with continued treatment. After hyperæmia a bleb forms, bursts and dries, to form a thick yellow crust at about the end of a week, and in ten days or so the sore had completely healed. As is well known now, the treatment can only be carried out in an institution where the necessary complicated apparatus is at hand, as explained in the original articles of Finsen and Bie. Morris and Dore briefly sum up the advantages and disadvantages of the method. The advantages were reliability, painlessness, excellent cosmetic results, less liability to relapse, and avoidance of surgical measures. The disadvantages are the long time required, the small area treated at a time, and the expense.

Rodent Ulcer and Epithelioma Contrasted.—F. T. PAUL, of Liverpool (*British Medical Journal*, February 9, 1901), in a clinical lecture directs attention to the difference between these diseases, first stating that they are pathologically distinct in origin, appearance, and history. Great as the difficulty has been in deciding exactly what sort of carcinoma rodent ulcer should be considered, there is a general consensus of opinion among pathologists that it commences in one of the appendages of the skin in contradistinction to epithelioma which commences in the mucous layer. Rodent ulcer usually begins as a small whitish pimple in the skin, the surface of which is smooth and often shiny from thinning of the epidermis, while in epithelioma the affected area is roughened and often warty. Rodent ulcer is limited to skin tissue; whereas epithelioma may occur wherever squamous epithelium exists.

Rodent ulcer very rarely infects the lymphatic tissue. It tends in its course to marked erosion and destruction, destroying in its progress all kinds of tissue, and very rarely, except in the beginning, forming a solid formation or growth outward, and in this differing from epithelioma. Radical surgical treatment is recommended.

Epitheliomatous Giant-cells.—AUDRY (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 12) concludes a brief study of the giant-cells found in epithelioma, as follows: In Malpighian epitheliomata there exist multinucleated elements, plasmodia, occasionally very richly developed. These cells are of epithelial origin, and exist independently of any participation of the leucocytes. They probably represent a form of degeneration of the epitheliomatous cellular elements.

OTOLOGY.

UNDER THE CHARGE OF
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General Perichondritis of the Auricle.—A general perichondritis of the auricle occurs under three forms according to Pohl, viz., an idiopathic, a secondary, and a tuberculous form. The first named is caused by the entrance of infectious germs at some spot on the auricle or their absorption from the auditory canal. The second form, called secondary perichondritis, is the result of trauma or the extension of external otitis or some other inflammatory process from the external meatus. The tuberculous form is found, according to HAUG (*Langenbeck's Archives*, vol. xliii.), in individuals already manifesting symptoms of tuberculosis elsewhere, or presenting a hereditary tendency to tuberculosis. Haug has demonstrated the tubercular nature of such cases by an examination of portions of the diseased cartilage of the auricle as well as of the pus evacuated from the diseased tissue.

In perichondritis of the auricle there is a general involvement, redness, and tumefaction of the entire auricle. The disease is usually the result of some exterior irritant, like cold, or a skin wound of the auricle, and very often both auricles are simultaneously affected. Under proper treatment recovery ensues without deformity.

The treatment should consist in soothing antiseptic solutions or ointments to the affected parts, with attention to the general health of the patient. If effusion beneath the perichondrium occur it must be treated like a case of othæmatoma with effusion.

LEUTERT (*Archiv f. Ohrenh.*, vol. xlvii.) reports that in all of his cases of *perichondritis of the auricle* he succeeded in obtaining the B. pyocyaneus in pure culture. The perichondritis in each instance followed incision of the posterior wall of the auditory canal in the so-called radical operation on the

mastoid. He thinks it would be well, therefore, in the after-treatment of cases in which a radical operation has been performed to bear in mind the possible presence of the bacillus pyocyaneus and adopt measures for its destruction. In *abscess of the auricle* the staphylococcus albus was found and was considered to be the causative factor.

Excision of the Ossicles.—W. SCHROEDER (*Archiv f. Ohrenh.*, April 19, 1900) reports the results of one hundred and thirty extractions of the hammer and anvil in the treatment of chronic purulent otitis media. He shows that this is the only sure means of benefiting suppuration in the attic, so important, because so near the brain. This operation should always precede any form of radical operation on the mastoid, as the former will generally cure the chronic purulency and prevent mastoid caries. Mastoid radical operations are thus avoided. The results of excision of the malleus and incus in chronic purulent otitis media in public practice among the poor are 50 per cent. of cures; in private practice, 80 per cent. Caries of the incus was present in 88 per cent. of Schroeder's cases. In 41 per cent. of these cases the malleus was normal. The hearing was improved in 65 per cent.; unchanged in 22 per cent., and slightly impaired in 13 per cent. of these cases. Facial paralysis occurred in two instances, but disappeared without treatment in six weeks.

GRUNERT and ZERONI (*Archiv f. Ohrenh.*, vol. xlvi.) of Schwartze's clinic in Halle, express the very justifiable regret that excision of the malleus and incus, through the external auditory canal, has of late been superseded by the "radical operation" upon the mastoid for the cure of chronic purulent otitis media, even in cases in which the endeavor should have been made to check the purulency by the simple operation of excision. Although this fact can in a measure be excused on account of the difficulty of the technique of excision of the ossicles through the auditory canal, and also the possible necessity of a second operation if the excision of the ossicles has not led to a cure of the purulent otitis, yet in the interest of our patients it must not be underrated. In a large number of their patients observed for many years after excision of the ossicles through the auditory canal this operation has brought about a lasting cure. They also state that in a number of cases in which they have been called upon to perform the radical operation on the mastoid they have found conditions in this cavity which seemed to indicate that the excision of the malleus and incus through the auditory canal would have been sufficient to have cured the purulency in the middle ear, and thus prevented the mastoiditis leading to a mastoid operation.

Operations on the Mastoid.—GRUNERT and ZERONI (*Archiv f. Ohrenh.*, August 3d, vol. xlvi.), report one hundred and twenty-four operations on the mastoid performed in Schwartze's clinic in Halle. Twenty-eight of these were performed for the relief of acute mastoiditis, ninety-five for chronic mastoiditis, and one for the relief of neuralgia of the mastoid. The last named case was not cured. Of the acute cases twenty-three were cured; one died from meningitis; one suffered from pyæmia and was under treatment at the time the report was written, and in three cases the final results

were unknown. Among the acute cases was the youngest patient in the 124, viz., a child aged seven months. The results in the ninety-five chronic cases were as follows: Unknown, 25; not cured, 12; cured, 44; under treatment, 5; and 9 died. The oldest patient of the entire series of 124 cases was in this last-named class, viz., a woman aged sixty-nine years. Among the acute cases cured was one of pyæmia with ligation of the internal jugular, and one of pyæmia calling for operation on the sinus and ligation of the jugular. Among the chronic cases cured were two of pyæmia, operation on the lateral sinus and ligation of the jugular. Of the chronic cases four died of meningitis, four of pyæmia, and one of rupture of a cerebral abscess.

Mastoiditis from Use of Nasal Douche ; Death from Leptomeningitis. —GRUNERT and ZERONI (*Archiv f. Ohrenh.*, August 3d, vol. xlvi.) have reported the case of a woman, aged fifty-seven years, who, by using a nasal douche, induced acute otitis media and mastoiditis. Chiselling open the mastoid was performed, and for four days the wound ran a normal course and entire convalescence seemed near at hand. On the fifth day after the mastoid operation fever, vomiting, and headache with deviation of the left eye (to the side opposite to the diseased mastoid) set in, and death occurred on the sixth day after the mastoid operation. The autopsy revealed purulent basilar meningitis with also purulent infiltration of the dorsal surface of the cerebellum, and pus in the posterior horn of each lateral ventricle. After removal of the dura of the base of the skull there was found on the anterior superior surface of the left petrous pyramid, between the labyrinth and the apex of the petrous bone, a loss of substance 4 mm. wide, filled with pus and reaching backward as far as the superior petrosal sinus, in which there was a somewhat firmly adherent clot. The labyrinth and carotid canal were free from pus. A grayish ostitic centre in the apex of the pyramid adjoined the deep extradural abscess.

It was held that the cause of the fatal purulent leptomeningitis was the deep-seated extradural abscess on the front surface of the petrous pyramid. In the absence of pus in the labyrinth of the ear and carotid canal one is forced to conclude that the course of the deep-seated extradural abscess was the intense otitis of the walls of the middle ear, extending all the way to the pyramid of the petrous bone. One learns from this case, that presented no suspicious symptoms, neither when admitted to the hospital, at the operation, nor for some days thereafter, how careful one must be in giving a prognosis even in an apparently harmless case of acute mastoiditis. A deep-seated extradural abscess, giving no size of its existence, may suddenly dash all hopes of seeing a patient recover, even after convalescence apparently has set in, as in the case reported above.

Chronic Suppurative Mastoiditis.—Latent mastoid empyema often presents the appearance of trigeminal neuralgia, or it may exhibit external symptoms slight in comparison to the internal underlying lesions in the mastoid cavity. In fact, even an extradural otogenous abscess may exist as a latent condition. If in the presence of otitic symptoms, especially if chronic, persistent pain continues anywhere on the side of the head corre-

sponding to the diseased ear, empyema of the middle-ear cavities from the attic to the mastoid without free outlet should be suspected. Pain now indicates either this condition or a graver one, viz., extradural otogenous abscess.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Disinfectant Properties of Alcohol.—The conclusions arrived at by Epstein and others concerning the value of alcohol as a disinfectant have been corroborated by BERTARELLI (*Il Policlinico*, 1900, through *Revue d'Hygiene*, January, 1901), who experimented with silk threads, infected with fresh and old cultures of *B. prodigiosus*, *B. pyocyaneus*, *B. pestis*, *B. cholerœ*, *B. typhosus*, *Staphylococcus pyogenes aureus*, and sporulating *B. anthracis* and *B. subtilis*, which were exposed at different temperatures and for periods ranging from five minutes to fifty days. The best results were obtained with alcohol of 50 per cent. strength, the power diminishing with departures in both directions from this dilution. Thus, 70 per cent. strength was more powerful than 25 per cent. strength, and both than 88 and 99 per cent. The action of any dilution on spores was practically nothing. Alcoholic solutions of corrosive sublimate (1 : 1000), carbolic acid (3 per cent.), chromic acid (1 per cent.), silver nitrate (0.40 per cent.), and zinc sulphocarbolate (2 per cent.) were more active the less the alcoholic strength.

Tin in Canned Foods.—Specimens of canned meats of various ages up to four years were examined by F. WIRTHLE (*Chemiker Zeitung*, 1900, xxiv., p. 263) with reference to the presence of tin and the probable influence of duration of contact on its amount. He concluded that the corrosive action increases slightly after the second year, and that the meat itself takes up a larger amount than the juice, but the amounts found in both were slight. The most marked corrosion occurs where the tin comes in contact with the fatty parts. With regard to the toxicological importance of tin in meats and fish, A. RÖSSING (*Zeitschrift für angewandte Chemie*, 1900, p. 147) asserts that the danger must be extremely slight and is unworthy of attention, for the compound formed is insoluble and so resistant to the action of the digestive juices that only the merest traces can be taken up. According to Wirthle, in some cases the compound is basic stannous chloride; in others a sulphide. Rössing believes it to be mainly an oxide.

Concerning the Anopheles Mosquitoes.—From the results of very numerous observations, PROFESSOR A. CELLI (*Journal of the Sanitary Insti-*

tute, January, 1901, p. 619) asserts that the larvæ of Anopheles live in water clean or foul, clear or turbid, acid or alkaline, and ferruginous, but not in water containing salt (salt marshes, sea water, and mixtures with fresh water in the proportion of two to one), very strong sulphur waters, nor water that is putrid from the putrefaction of animals and textile plants. They avoid water in which there is any movement (currents, ripplings, caused even by light winds; mechanical disturbance, as by the passage of boats), or which is without growth of aquatic plants, of which they prefer the filamentous species which do not occupy the whole free surface of the water where they rise to breathe. The mature mosquitoes bite in the evening and at night. They are transported by winds, in grass, hay, etc., and in vehicles of various kinds.

The old idea that putrid waters and the emanations therefrom are causes of malarial fevers is inconsistent with the fact that the specific gnats do not live in stinking waters, and the prejudice against brackish water and salt marshes on the score of being conducive to malaria is likewise inconsistent with repeated demonstrations that the larvæ cannot live in very brackish or salt water. He points out that all hydraulic improvements designed to free districts from malaria must sweep away the conditions favorable to the life of the infecting mosquitoes—must either remove fresh waters from the surface or put them in motion. When complete removal of marsh water is impossible, as is often the case where the movement of the water is hindered by vegetation, the larvæ have abundant opportunity for development; and even where currents exist, there are, along the edges, incurvations or grass where the larvæ hide. Hence, drainage canals should be periodically flushed at intervals of twelve to fifteen days to clear them of larvæ, and all marshy vegetation should be torn up as it grows. In malarial districts, dwellings should be built in the highest and dryest situations possible, though even there the mosquitoes may go or be carried, as happens in the highest parts of the Roman Campagna, which are greatly infested. Even the upper floors of tall buildings are not free from the visits of mosquitoes when they are hungry for blood, and all windows and outer doors should be protected against them by wire netting, and the screen doors should be provided also with springs to cause them to be kept closed when not in use. The walls of the rooms should be light in color, so that mosquitoes resting on them may easily be seen. Sometimes even the flue outlets of the chimneys should be screened. Trees in the near neighborhood of houses act as a hiding place for mosquitoes, which in the evening try to gain entrance, especially into rooms in which lights are burning.

In agricultural operations, he points out that no turning up of the soil can, as has been believed, be the cause of malaria. Irrigation cannot be detrimental, provided the water reaches the soil in no greater amount than it does in a shower of rain and the canals by which it flows in or out are not of such a character as to allow of stagnation. But ditches in which water becomes stagnant and vegetation accumulates afford good breeding facilities to the mosquitoes. Periodical flushing at intervals of twelve to fifteen days will overcome the difficulty. Rice fields cannot be made healthy, because, even though the water may run, there are always dead points where there is no current, and there the larvæ are protected. Moreover, the plants themselves afford a shelter.

According to *The Lancet* (March 23, 1901, p. 875), Dr. Patrick Manson has proposed an expedition to the Pacific Islands to investigate the causes of the apparently capricious distribution of the malarial mosquitoes, the presence or absence of which depends upon local conditions inimical to them. It is proposed to study the mosquitoes of an island where the disease is unknown and those of another where it is endemic, and then to convey the specific varieties to the non-malarial place for the purpose of attempting there to breed them under laboratory conditions and in the company of fauna and flora peculiar to the place, with the view to discover something antagonistic to their existence, which may then be introduced into localities where malaria is endemic.

Selenium Poisoning from Impure Beer.—At a meeting of the Royal Commission on Arsenic Poisoning, held on March 15, 1901 (*British Medical Journal*, March 23, 1901), in the course of the investigation of the recent extensive epidemic of arsenic poisoning due to beer made with impure glucose, Dr. F. W. FUNNICLIFFE stated that he and Dr. Rosenheim had found selenium in the incriminated sulphuric acid (used in converting starch to glucose) to the extent of about 0.3 per cent. He found also one part in 7000 of invert sugar. Examination of beer made with brewing material manufactured with acid containing selenium compounds demonstrated that the poison passes into the beverage. Animal experimentation has shown that the symptoms of selenium poisoning and of arsenic poisoning are in all respects similar. But the action of selenious acid is cumulative, and this helps explain the symptoms which were attributed to arsenic in cases in which the beer consumed contained but small traces of that substance. The marked occurrence of wasting was to be explained by the specific action of selenious acid, as might also the occurrence of symptoms in cases in which arsenic was not found in the ingesta.

According to Willcox (*The Lancet*, March 16, 1901, p. 778), while selenium gives no mirror in the absence of arsenic in the Marsh test, it has a most decided effect upon the nature of the mirror where arsenic is present. The proximal portion of the mirror is red in color, while the rest has the usual appearance; and the extent of the reddened portion varies according to the amount of selenium present. He found no selenium arsenic mirrors in an examination of many samples of arsenical beer.

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CANCER DISTRIBUTION AND STATISTICS IN BUFFALO FOR THE PERIOD 1880–1899, WITH SPECIAL REFERENCE TO THE PARASITIC THEORY.[1]

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WITH the real or apparent increase of cancer throughout the civilized world, at a rate which gives cause for alarm, renewed interest has been aroused in this dread affliction, and in many countries laboratories are being established for the scientific investigation of the nature and cause of cancer, and societies are being organized for the statistical study of the disease.

The question of paramount importance is whether cancer is or is not a parasitic disease, as upon the answer to this broad question depend the special lines of research that are indicated for elucidating the exact cause and the control of the disease.

It must be admitted that up to the present time no convincing scientific demonstration of the parasitic nature of cancer has been adduced and generally accepted, though certain most interesting and suggestive findings have encouraged the hope that the pathologist might be close on the trail of the real agent of the disease. Such scientific evidence, taken in conjunction with much indirect and cumulative evidence derived from many sources, has given good reason for holding tentatively the theory that cancer is parasitic in origin and for pursuing its study upon this theory. In the meantime, and before definite assurance is had that cancer is the result of parasitic infection, no line of study should

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[1] Summary of paper in the Third Annual Report of the Director of the New York State Pathological Laboratory of the University of Buffalo to the New York State Legislature, April, 1901.

be neglected that offers any prospect of elucidating the main question of parasitic origin.

Next to the direct scientific study the most promising field of research seems to lie in the statistical study of the disease, in the collection and analysis of observations on the distribution and spread of the disease, and its relation to race, social and economic conditions, and natural environment. The latter method of study has already yielded most important clews for the parasitic theory, and if carried out systematically and extensively might, perhaps, result in the establishment of this theory beyond reasonable doubt. The history of medicine offers many examples of the establishment by indirect methods of study—by cumulative evidence, observations, statistics, etc.—of the parasitic or infectious nature of different diseases in advance of the scientific demonstration of such.

Guided, then, by such thoughts and by the work of others along this line, the writer was induced to undertake the investigation here recorded with a view to ascertaining whether the statistical study of cancer in the city of Buffalo offered any support for the parasitic theory of cancer or furnished any incidental side-lights that were of interest to the subject. The main purpose was to find whether there occurred in the city any *local foci of the disease* in special regions of the city or in certain houses, out of proportion to the population of such places, and, in case such foci occurred, what relation existed between them and their natural environments and the conditions of race, social status, and habits of the population. So far as the writer is aware no similar investigation on so large a scale has been attempted for a large city, though the same principle has been applied by a few investigators in small towns and villages in Germany, France, and England. Of the various previous investigations none is so striking and important as evidence for the parasitic theory as that of Behla,[1] at Luckau, in Germany, which has attracted wide-spread interest and attention. It seems well, therefore, before stating the results of our investigation in Buffalo, and as indicating somewhat the lines that our study has followed, to give a brief summary of Behla's work, as follows:

Behla's Observation. The town of Luckau consists of a central main portion with 3000 inhabitants, flanked on the east and west respectively by subdivisions of the city or suburbs (vorstadt), called the Kalau and Sando suburbs, each with a population of 1000, making a total population of 5000 for the entire town. During a period of twenty-two and one-half years (1875–1898) no cases whatever of cancer were noted in

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[1] Robert Behla. Ueber vermehrtes und endemisches Vorkommen des Krebses. Centralblatt f. Bak., Parasit., u. Infekt., 1898, B. xxiv., Abteil. 1, S. 780, 829, 875, 919; and Die geographisch-statistische Methode als Hülfsfactor der Krebsforschung. Zeitschrift f. Hygiene u. Infections-krankheiten, 1899, B. xxxii., S. 123.

the western suburb, Sando; cases were not infrequent (nicht selten) in the central main town, and 73 deaths from cancer (cancer of the stomach and liver predominating) out of a total of 663 deaths from all causes occurred in the eastern suburb, Kalau. Cancer, therefore, caused 1 out of every 9 deaths in the suburb Kalau as against 1 out of 25 to 30 in the entire town, whereas no cases at all occurred in the western suburb, Sando. In Prussia, as a whole, the mortality-rate from cancer was 1 to 30 to 50. During the last year and a quarter of this period cancer claimed 10 victims in the suburb Kalau, or 1 out of every 100 inhabitants.

During the period of twenty-two and one-half years the number of inhabitants and their habits of life remained the same. The population was agricultural and lived on the products of its own gardens and fields. The dwellings were similar in kind and size and were generally damp. The soil of the suburb Kalau and of the central town was flat, low, and moist; that of the suburb Sando was elevated, sandy, and dry. The special distinction of the three divisions of the town consisted in the location of a ditch (graben) which, deriving its water from a stream on the west below the suburb Sando, without touching this suburb, closely encircled the central town and the eastern suburb, Kalau. Cancer followed the course of this ditch, occurring not infrequently in the central town chiefly among those whose gardens bordered on the ditch, and most frequently in the eastern suburb, Kalau, all the gardens of which were watered from this ditch. In the suburb Sando, which was not touched by the ditch, no cases of cancer were known. The suburb Kalau, which we may designate as the *cancer-suburb*, consisted of a main street, with two cross streets, containing 127 houses, whose gardens in general backed upon the surrounding ditch. Of the 127 houses 56 were cancer houses, 43 representing a single case, 10 two cases, and 1 four cases.

Behla's opinion was that the peculiar and unequal distribution of cancer through the different parts of the town of Luckau could be explained only by reference to the location of the ditch. In the cancer suburb the gardens were all watered from the ditch, which contained stagnant, foul water, and the people were in the habit of rinsing the vegetables grown in their gardens in water taken from the ditch. Behla believed that the garden vegetables became thus infected, and in turn infected the people with cancer. He considered the various conditions of life and habits among the people, and focused down to the uncooked garden vegetables, of which large quantities were eaten raw, as the most probable source of infection.

It is evident that such observations as the above, if correctly and carefully made, and if multiplied so that the factor of chance be eliminated, must be regarded as strong evidence, if not as proof, of the parasitic origin of cancer. With this striking example in mind, as

well as many other somewhat similar observations, showing the irregular distribution of cancer and its tendency to occur in foci, resembling the well-known endemic foci of other infectious diseases, the writer undertook to ascertain the distribution of cancer in the city of Buffalo during the twenty-year period, 1880–1899 inclusive, with the results shown in the following paragraphs :

The statistics were collected from the original official certificates of death, signed in each case by a physician, preserved as the mortality records of the Board of Health of the city of Buffalo. To select out of these records only the cases of malignant disease required the careful examination of all death certificates or (in some years) the transcribed individual records of the same. Such cases only were collected as were shown by the death certificates to have had as the primary or accessory cause of death malignant tumor, under any of its various appellations —e. g., cancer, carcinoma, epithelioma, sarcoma, malignant growth, etc. A separate card for collecting the statistics of each case was used, covering the following points of inquiry :

Name.
Age,   years   months   days.
Sex.
Color and race.   single   married   widowed.
Cause of death.
Accessory cause of death.
Place of birth.
Father's name and birthplace.
Mother's name and birthplace.
Place of death.
Date of death.
Occupation.
How long resident here.
Last place of residence.
Physician reporting.

With respect to residence, the cases may be classified as follows :

1. Those dying at home, whose residence in the city (street and number) was given.

2. Those dying in public or private hospitals, usually following operation, whose residence in the city (street and number) was given.

3. Those dying in public or private hospitals whose residence was not stated, who were buried in Buffalo, and whose city residence was found in the records of the institution where death occurred or in the city directory.

4. Those dying in hospitals, without ascertainable city address, and buried in Buffalo.

5. Those dying in hospitals or lodging houses, without city address on death certificate, on the hospital records, or in city directory (year of death and year preceding death), and buried outside of Buffalo, as

shown by the records of the city or of the institution where death occurred.

6. Those dying in Buffalo, whose residence was stated to be outside of Buffalo.

Of these six classes Nos. 5 and 6, regarded as non-resident and including 114 cases, were excluded from further consideration; Nos. 1 to 4, including 2299 cases, were regarded as resident and were used as the basis of the following statistics and tables; and Nos. 1 to 3, including 2005 cases whose city residence was known, were plotted on the city map according to the residence of the cases. The number of deaths from malignant disease, by years, classified by certain facts of residence, is shown in Table I.

TABLE I.

Showing the number of deaths from malignant disease reported to the Buffalo Board of Health, classified according to residence, and by year, for the twenty years 1880–1899.

	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	10 yrs 1880–1889
Classes 1–3. Resident cases, city address known. (Plotted on map.)	42	47	56	58	68	94	61	87	100	97	710
Class 4. Resident cases, city address not known. (Not plotted on map.)	8	9	13	9	9	6	9	6	9	10	88
Classes 1–4. Total cases accredited to Buffalo.	50	56	69	67	77	100	70	93	109	107	798
Classes 5–6. Non-resident cases, not accredited to Buffalo and excluded from statistics below.	...	...	...	...	...	1	3	3	5	1	13
Classes 1–6. Total cases from all sources reported to the Buffalo Board of Health.	50	56	69	67	77	101	73	96	114	108	811

	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	10 yrs 1890–1899	20 yrs 1880–1899
Classes 1–3. Resident cases, city address known. (Plotted on map.)	112	108	97	103	133	121	140	155	170	156	1295	2005
Class 4. Resident cases, city address not known. (Not plotted on map.)	17	18	15	11	16	24	33	21	21	27	206	294
Classes 1–4. Total cases accredited to Buffalo.	129	126	112	117	149	145	173	176	191	183	1501	2299
Classes 5–6. Non-resident cases, not accredited to Buffalo and excluded from statistics below.	2	1	7	3	14	11	18	10	16	19	101	114
Classes 1–6. Total cases from all sources reported to the Buffalo Board of Health	131	127	119	120	163	156	191	186	207	202	1602	2413

House Distribution, as Plotted on Map of City. The distribution by residence through the city of the 2005 deaths from malignant disease whose residence was known[1] was plotted on a large-sized map[2] (3 x 2 feet) of the city. A colored dot was stamped on the site of each case, red for cases dying in the decade 1880–1889 and green for cases dying in the decade 1890–1899. Multiple cases occurring in the same house were indicated by red squares inclosing the dots representing such cases. We regret that it is impracticable to reproduce this map here, but the essential features shown by it can be stated briefly, as follows :

A glance shows the irregularity of distribution of the dots—a scarcity in certain parts and a concentration in other parts of the city. A remarkable concentration is shown in those wards inhabited largely by foreigners, and particularly by Germans. Is this concentration real, due to increased frequency of cancer in such parts, or only apparent, due to greater density of population in the wards showing the greatest number of dots? To ascertain this the number of dots must be compared with the size of the population in each ward. As the relative distribution of population through the city has changed during the twenty years, and the ward boundaries also were changed in 1891, there is no accurate method of estimating for the whole period the cancer-rate based upon a common standard of population by wards, and only a rough approximation can be obtained. This has been done (Table II.) by comparing the number of dots in each ward with the ward population of 1900 (United States census), and thus obtaining the number of dots in each ward per 1000 of population. The resulting ward rates thus obtained serve the purpose of indicating roughly the ward distribution of cancer based upon a common standard of population. The actual rates are less important than the general tendencies shown by the rates, broadly considered. Those wards showing higher and lower rates than the average rate for all wards were marked on the map, against the ward number, with a plus ($+$) or minus ($-$) sign respectively, indicating that the cancer rates in such wards were high or low, and the amount of such variation is shown by percentages in Table II.

[1] Correction for all changes in house numbers was made by references to the official records of such changes in the Department of Streets of the city of Buffalo.

[2] This map is reproduced in full size in the Third Annual Report of the Director of the State Pathological Laboratory to the New York State Legislature for 1901, above referred to, and can be obtained also from the publishers, the Matthews-Northrup Co., Buffalo.

TABLE II.

Showing the distribution of cancer mortality by wards and according to the relative population of wards.

Wards.							Population (1900).	Cases.	Cases per 1000 of population (1900).	Per cent. above or below average rate.[1]
Ward	.	.	.	.	.	1	6,488	36	5.5	— 17 per ct.
"	.	.	.	.	.	2	9,201	57	6.1	— 8 "
"	.	.	.	.	.	3	9,853	96	9.7	+ 44 "
"	.	.	.	.	.	4	10,028	71	7.0	+ 4 "
"	.	.	.	.	.	5	16,611	52	3.1	— 53 "
"	.	.	.	.	.	6	7,371	101	13.7	+104 "
"	.	.	.	.	.	7	8,536	84	9.8	+ 46 "
"	.	.	.	.	.	8	9,532	58	6.0	— 10 "
"	.	.	.	.	.	9	16,177	96	5.9	— 11 "
"	.	.	.	.	.	10	8,009	70	8.7	+ 29 "
"	.	.	.	.	.	11	29,414	70	2.3	— 65 "
"	.	.	.	.	.	12	7,765	61	7.8	+ 16 "
"	.	.	.	.	.	13	9,888	83	8.3	+ 23 "
"	.	.	.	.	.	14	29,326	92	3.1	— 53 "
"	.	.	.	.	.	15	9,257	92	9.9	+ 47 "
"	.	.	.	.	.	16	8,337	76	9.1	+ 35 "
"	.	.	.	.	.	17	18,190	91	5.0	— 25 "
"	.	.	.	.	.	18	29,071	93	3.1	— 53 "
"	.	.	.	.	.	19	11,708	60	5.1	— 23 "
"	.	.	.	.	.	20	8,897	83	9.3	+ 38 "
"	.	.	.	.	.	21	13,604	127	9.3	+ 38 "
"	.	.	.	.	.	22	15,587	91	5.8	— 13 "
"	.	.	.	.	.	23	12,858	90	6.9	+ 2 "
"	.	.	.	.	.	24	25,694	109	4.2	— 37 "
"	.	.	.	.	.	25	20,985	66	3.1	— 53 "
	Total	.	.	.	25		352,387	2005	Average 6.7	

As thus indicated, nearly every ward in the region showing a concentration of dots is shown to represent a real and not merely an apparent concentration of cancer. The region showing the greatest concentration is distinctly a region occupied largely by foreigners, Germans greatly predominating, consisting of wards 15, 16, 6, 12, 13, 7, 8, 9, 10, 3, and 4. Compare with this area of concentration (German quarter) an area of more than equal population, inhabited chiefly by native born, consisting of wards 22, 24, 25, 17, and 18, which shows only about one-half the number of dots. The contrast is striking. The figures for the two areas are as follows:

German wards . . . . . Population 104,753 Cases 888
Native " . . . . . " 109,527 " 450

To represent the contrast even more strikingly compare ward 24, which is one of the finest residence sections in the city, occupied chiefly by native born, with the three wards most strongly German in their population, namely, wards 15, 16, and 6. The population of the two sections is about equal—25,694 and 24,965 respectively—but the cancer cases in the German wards (269 cases) are about two and one-half times as many as those in the American ward (109 cases). Until the United

[1] The only ward that showed a change in its relative position as to cancer frequence—i. e., above or below the average—for the entire period, 1880-99, and for the second decade, 1890-99, was ward 9, which changed from a minus (—) ward for the whole period to a plus (+) ward for the second decade.

States census of 1900 is published we have no exact method of esti-
mating the proportion of foreigners and different races in the various
city wards, and we have therefore been obliged to rely upon the officials
of the city government for information in regard to the race distribu-
tion of population in the different wards of the city. We have no doubt,
however, of the substantial accuracy of their estimates.

There is shown, then, a centre of concentration of cancer in those
wards in which the German element predominates. As to other classes
of foreigners, we can draw no conclusions from the map distribution
alone considered, as there is less tendency upon the part of other nation-
alities to concentrate in certain parts of the city than is shown by the
Germans.   There are, for instance, no distinct English, Canadian, or
Irish quarters in the city.   The Poles, for reasons stated below, are
classed with the Germans and share with them in large measure their
ward distribution.   There is, however, a distinct Italian quarter in the
lower end of ward 19, centring in Canal Street, a quarter very densely
populated.   This quarter shows a conspicuous absence of any concen-
tration of dots on the map, and the ward of which it is a part shows a
low rate (see Table II.).   This fact agrees with the low cancer rate in
Italians, as shown below under *Race Distribution*.   That a true concen-
tration of cancer occurs among the Germans out of proportion to their
representation in population will be shown again below by other con-
siderations, thus confirming the concentration in the German quarter
shown by the map.

Aside from the relation to race, no relation between cancer distri-
bution and local conditions could be determined from the map distri-
bution.   There is no relation of cancer to the water-courses and water-
front of the city, thus differing from Behla's finding at Luckau.   All
the wards bordering on the water-front show low rates.   No peculiar
conditions are found in the German wards to excite suspicion, so far
as we have been able to observe.   It is a fact worthy of mention, how-
ever, in connection with Behla's charges against uncooked garden vege-
tables, that the Germans quite commonly raise a few garden vegetables
and are in the habit here, as elsewhere, of eating many of them uncooked,
and thus possibly contaminated by reason of some unknown conditions
of nature.   No special conditions of soil, however, seem to characterize
the German quarter as opposed to other parts of the city.

Multiple-case Houses (Cancer Houses).   As indicated on the map, 44
of the houses in which cases of death from cancer occurred represented
more than one case, 41 houses having had two cases and 3 houses three
cases each.   Of the 2005 deaths from cancer where the residence was
known, 91, or 4.53 per cent., occurred in such houses.   While we are
not able to affirm that such a percentage is more than would be natu-
rally expected, still we are somewhat inclined to this opinion in view of

the fact that Buffalo had 37,290 dwellings in 1890 and probably more than 50,000 in 1900.

An inspection of all the "cancer houses" was made, and they were found in general to be one or two-story frame houses, without basements or cellars, and only exceptionally of the class known as large tenement houses.   In fact, the city contains few large tenement houses, most of the houses being small single dwellings, surrounded each by its own yard.   The average number of occupants in the cancer houses was found to be 6.94 per house—about the same as in the city at large, which showed an average of 6.84 persons per dwelling in 1890 (United States census).   The same tendency shown by the cases in general is seen also in the cancer houses to concentrate in the German district.   None of these cancer houses were institutions or hospitals, public or private, all such institutions being excluded from consideration.

The interval of time separating the deaths from cancer in the different cancer houses is shown in Table III.   In almost half of the houses the interval was less than five years, and in three-quarters it was less than ten years.

<div align="center">TABLE III.</div>

Classifying the multiple-case houses by the interval elapsing between the cases.

1st year	.	.	.	.	.	.	.	.	.	.	4	
2d "											6	
3d "	.	.	.	.	.	.	.	.	.	.	6	...21
4th "											3	
5th "	.	.	.	.	.	.	.	.	.	.	2	
6th "	.	.	.	.	.	.	.	.	.	.	4	...36
7th "											2	
8th "	.	.	.	.	.	.	.	.	.	.	2	...15
9th "											6	
10th "	.	.	.	.	.	.	.	.	.	.	1	
11th "	.	.	.	.	.	.	.	.	.	.	2	
12th "											3	
13th "	.	.	.	.	.	.	.	.	.	.	1	... 8
15th "	.	.	.	.	.	.	.	.	.	.	2	
17th "	.	.	.	.	.	.	.	.	.	.	1	
19th "	.	.	.	.	.	.	.	.	.	.	2	... 3
											47[1]	

In only a minority of the cancer houses was it possible to ascertain the relationship or lack of such between those dying of cancer in such houses.   Blood relationship could be ascertained in only four double cases, as follows: Father and daughter, mother and daughter, father and son, and brother and sister.   The second death followed the first in these four double cases, respectively, in the second, sixth, first, and third year.   Five of the eight cases were in Germans, the other three in Americans.

The relationship of husband and wife was found five times, all the

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[1] The difference between the number of multiple-case houses and the intervals is due to the occurrence of triple cases in three of the houses.

ten individuals being Germans. The second death followed the first in
the first, second, second, fourth, and ninth year respectively.

Increased Cancer Rate. Fig. 1 shows graphically the increasing rate
of cancer mortality per 100,000 of estimated[1] population in Buffalo,
yearly, for the twenty years 1880–1899. During this period the rate
increased from 32 to 53 per 100,000 of population, or 65 per cent.
This progressive increase agrees with a similar marked increase for all
countries in the civilized world, and is the chief cause for alarm in the
cancer problem. While tuberculosis and most other infectious diseases
show a steadily decreasing mortality in different countries, everywhere
cancer continues to increase year by year in the rate at which it claims
its victims. After crediting the various factors that have been shown to
account for an increasing cancer rate, viz., increased longevity, improved
certification of deaths, more accurate diagnosis, etc., still there seems to
be a large residue of cancer increase that cannot be accounted for by
such explanations. There must obviously be a limit to the operation

FIG. 1.
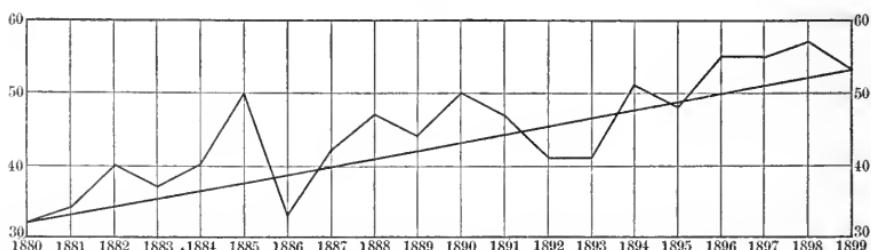
Showing the increasing death-rate from malignant disease per 100,000 of population in Buffalo
yearly for the period 1880–1899.

of such factors as explanation of the continued increase of cancer. The
rate of increase is too high, progressive, and general throughout the
world to be anything less than real, and we believe that expert opinion
is gradually reaching this conclusion.

The rate of increase in Buffalo is seen to be less marked for the second
than the first decade. This is probably explained, in part at least, by
the well-known falling off in immigration during the second decade as
compared with the first. As will be shown below (see *Race Distribution*), the mortality rate from cancer for foreigners in general, and for
Germans in particular, is much higher than for native born, hence the

[1] The exact population was known for the years 1880, 1890, and 1900, from the U. S. census.
For intermediate years it was estimated by the mathematical formula of geometrical progression, the method employed by the Registrar-General of England. This method applies strictly
only to the natural increase of population by the excess of births over deaths, and not to the
increase or decrease by immigration and emigration. The latter fluctuate year by year, due
to temporary influences operating to increase or check immigration and emigration. Hence,
the curve between the end points can be regarded merely as approximately correct. Still, as
there is no importance attaching to the rate for the intermediate individual years, and as
merely the general rate of increase through the entire period is of interest, the plotting serves
its chief purpose in showing this general increase through a period of twenty years, and is
therefore of almost equal value with a plot correct for all its intermediate points.

ratio of these two general elements of the population (foreign born and native born) must be considered in drawing conclusions from the cancer rate and the change of such rate through consecutive periods of time. This important factor seems to have been previously unrecognized and neglected by writers on the cancer rates of the cities and States of the United States, where foreigners constitute so considerable a proportion of the population. The Buffalo statistics show that foreigners, as a class, are about four and one-half times more susceptible to cancer than are those of native birth, and the United States census of 1890 showed for twenty-eight large cities in the United States that foreigners were about three and one-fifth times more susceptible to cancer than those of native birth. That the increased cancer rate in Buffalo—from 32 to 53 per 100,000 of population from 1880 to 1899—cannot be attributed simply to an increased proportion of foreign immigrants in the population of the city is indicated by the fact that the city's foreign population increased only from 33 per cent. to 35 per cent. of the entire population from 1880 to 1890 (United States census). The proportion of foreigners in 1900 has not yet been published, but will probably show a decrease from the figures for 1890. It would be interesting and valuable to show the rate of increase of cancer per 100,000 of corresponding population separately for foreigners in general, Germans in particular, and those of native birth; but it would be possible to do so only for the census years 1880 and 1890, and as the figures for single years for each class are relatively small, the chances of accidental variation would render such a calculation of little value.

Race Distribution. The distribution of malignant disease according to the place of birth of those affected is shown in Table IV. The striking fact in the race incidence of cancer shown by this table is that, individually and collectively, *all foreign nationalities show a higher rate than the native born* (United States) in proportion to representation in population.[1] Those of foreign birth, as a class, constitute 35 per cent.

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[1] The representation in the population of the city of the different nationalities and classes used as the basis of calculation is that shown by the U. S. census of 1890. This was chosen as the closest approximate estimation obtainable for the twenty-year period, falling midway in the period. The changes occurring from 1880 to 1890 in some of the more important classes are shown in the following table, based upon the U. S. census:

Year					1880		1890		1900	
Total population	.	.	.	.	155,134		255,664		352,387	
Native born	.	.	.	66.9	per ct.	64.9	per ct.	Not published.	
Foreign born	.	.	.	33.0	"	35.0	"	"	"
German	.	.	.	16.4	"	16.6	"	"	"
Polish	.	.	.	0.4	"	3.4	"	"	"
Irish	.	.	.	.	6.6	"	4.5	"	"	"
English	.	.	.	.	2.7	"	2.7	"	"	"
Scotch	.	.	.	.	0.7	"	0.6	"	"	"
Canadian	.	.	.	.	3.8	"	4.1	"	"	"
Italian	.	.	.	.	....		0.7	"	"	"

The census figures for 1900, not yet available, will probably show a falling off in the percentage of the foreign-born population. As a moderate increase is shown in the percentage of

of the entire population and 70.9 per cent. of the entire cancer mortality of the city, whereas, by contrast, the native born represent 64.9 per cent. of the population of the city and only 29 per cent. of the cancer mortality. Hence, estimated on an equal basis of population, the death-rate from cancer in the city of Buffalo is found to be 4.59 times greater for those of foreign birth than for those born in the United States.

TABLE IV.

Showing distribution by race and race-groups and by sex of malignant tumor in Buffalo, 1880–1899.

Birthplace.	Male	Female.	Both.	Ratio m. to f. the latter taken as 100.[1]	Per ct. of all cases.[1]	Per cent. of population of Buffalo by nationalities (U.S. Census, 1890).[1]	Ratio of frequence of malignant disease by races, compared with native born as 1.00.[1]
Germany	446	482	928	92	40.3	16.6	5.50 times 1.00 (U.S.)
United States	227	440	667	51	29.0	64.9	1.00 (standard of comparison).
Ireland	111	183	294	60	12.7	4.5	6.40 times 1.00 (U.S.)
England	41	77	118	53	5.1	2.7	4.27 " " "
Canada	23	66	89	34	3.8	4.1	2.09 " " "
Poland	29	25	54	116	2.3	3.4	1.52 " " "
Scotland	8	20	28	40	1.2	0.6	4.54 " " "
France	9	11	20				
Italy	8	7	15	......	......	0.7	1.93 " " "*
Switzerland	7	3	10				
Russia	5	4	9				
Holland	4	3	7				
Austria	1	4	5				
Sweden	2	3	5				
Belgium	1	1	2				
Spain	.	2	2				
Norway	1	...	1				
Denmark	...	1	1				
Europe (not specified)	1	2	3				
Not stated	14	27	41	51	1.7		
Total	938	1361	2299	68	100.0		
Germany and Poland	475	507	982	93	42.7	20.1	4.81 times 1.00 (U.S.)
Europe except Germany and Poland	199	321	520	61	22.6		
Europe except Germany	228	346	574	65	24.9		
United States & Canada	250	506	756	49	32.8		
Great Britain & Ireland	160	280	440	57	19.1	8.0	5.13 " " "
All foreign countries	711	921	1632	77	70.9	35.0	4.59 " " "
All foreign countries except Germany & Poland	236	414	650	57	28.2	14.8	4.31 " " "

Individually each foreign nationality shows a similar preponderance over the native born, varying from 1.93 to 6.40. It would be unsafe

foreign born during the first decade, and as there is good reason for believing that a corresponding decrease will be shown for the second decade, we are probably not far amiss from the true approximation for the whole period in taking the known figures for 1890 as the basis of calculation, though in so doing we acknowledge the introduction of possible errors. Therefore, the resulting figures, representing the frequence of cancer in the different race-groups compared with those of native birth, cannot be regarded as exact but only as approximate and are so treated by us in drawing conclusions from the same. The most accurate method would be to state the rate of cancer per 100,000 for each race, and we regret that it is impossible to obtain data for such an estimation.

[1] The ratios and percentages are given for only those races that are represented by a fair number of cases.

to draw conclusions from these figures as to the relative susceptibility to cancer of each individual race, as the total number of cases for the various individual races is too small to warrant their trustworthy use for this purpose. However, a few races and race-groups are represented by a sufficiently large number of cases upon which to base such conclusions, at least in a broad way. It is seen that the Irish show the greatest cancer rate, namely, 6.40 times that of the native born. The Germans come next, with a rate 5.50 times that of the native born. The English and Scotch show a rate of 4.27 and 4.54 respectively. The lowest rate shown by any race, excluding the Poles, for reasons mentioned below, is that of 1.93 for the Italians, though the figures upon which this rate is based are too small to be more than suggestive.

In considering race groups we have united the Germans and Poles, as there is no satisfactory method of accurately separating them, for the reason that most of the Poles in Buffalo come from German Poland and give their nationality indifferently as German or Polish. Moreover, there are many characteristics of life common to both peoples. The Germans and Poles together, then, show a cancer rate 4.81 times that of the native born as compared with a rate of 4.31 for all foreigners except Germans and Poles. The Germans and Poles, therefore, show a rate in excess of all other foreigners, as a class, and are exceeded only by the Irish, who show the highest rate, namely, 6.40.

The general conclusions, then, are as follows: The foreign-born population of Buffalo shows a cancer rate several times greater than that of the native born, and of the different nationalities the Irish seem to have the highest rate, the Germans and Poles the next highest rate, and the Italians the lowest rate.

In corroboration of the high cancer rate in the foreign born as compared with the native born, shown by the Buffalo statistics, the following table, modified from the United States census, is shown:

TABLE FROM THE U. S. CENSUS.

Showing for 28 cities in the United States the death-rates for cancer and tumor during the census year 1890, by general nativity per 100,000 of corresponding population, and for 18 of these cities the additional distinction of certain birthplaces of mothers.

28 cities in the United States.	Aggregate.	White.				Colored	Birthplaces of mothers (18 cities).		
		Total.	Native born.				United States (white).	Ireland	Germany.
			Total.	Both parents native.	One or both parents foreign.	Foreign born.			
Total	52.99	53.60	31.12	52.32	17.41	99.23	41.01	39.33	65.40	59.83

This table shows that for twenty-eight large cities in the United States in 1890 the mortality from cancer and tumor per 100,000 of corresponding population was 31.12 for those of native birth and 99.23 for those of foreign birth, or a rate for foreigners 3.18 times that for native born. [It also shows the remarkable and inexplicable fact that among those who were born in the United States cancer is more than 3 times more frequent in those whose parents were also native born than in those whose parents, one or both, were foreign born !] The United States census of 1890 unfortunately did not classify its mortality statistics by the birthplace of the deceased, but by the birthplace of the mother of the deceased, and there is no way of determining for a given class whose mothers were born in a certain foreign country how many of such class were born in the country of mother's birth and how many were born in the United States from such mothers. However, in so far as the mother's birthplace is a guide to the birthplace of a certain proportion of a given class, and thus of the class, the above table confirms our Buffalo statistics by indicating that the Irish show a somewhat higher cancer rate than the Germans, both showing very high rates.

We have made no distinction between blacks and whites in our statistics for Buffalo, as the colored population is so small as to be insignificant.

In considering the high cancer rates of the foreign born we must take account of the fact that the average age and the age-periods of the foreign born are considerably higher than those of the native born, for cancer is a disease occurring chiefly after middle life. The amount of correction in the high cancer rates of the foreign born on this account cannot be estimated,[1] but that it must be considerable is evident. However, it seems highly improbable that this factor could account for more than a fair share of the very high rates in the foreign born when we consider that the foreign born in Buffalo show 4.59 times the cancer rate of the native born, and that in the twenty-eight cities of the above table the corresponding rate is 3.18. We apparently have, then, a real and absolute preponderance of cancer in the foreign born over the rate in the native born. Moreover, the rates in the foreign-born immigrants (after ample deduction for age influence) are much higher than the rates of the same nationalities in their own countries, as published in the official mortality reports of such foreign countries. [No striking difference in the general cancer rates of Germany, Great Britain, and the United States is shown in the official mortality records of these countries.] It is thus shown that cancer claims not only a vastly higher percentage of victims among the foreign-born immigrants in the United States than among the native born, but that such immigrants show a

[1] The ideal method of comparison of the native-born and foreign-born rates, taking account of age differences, would be by determining for each class the rate of cancer per 100,000 of corresponding population for each age period.

similar great increase over the general rates of their kinsmen in the foreign countries from which they emigrated.

The figures and rates above given emphasize the importance of the general facts pointed out. The explanation of these facts is not simple. There are those, doubtless, who would argue that these facts could be brought into harmony with the embryonic theory of the origin of cancer by supposing that foreign immigrants, owing to the hardships of life in a new country, exhaust their vitality and subject their organs to degenerative changes, thus laying the foundation for the growth of the hypothetical misplaced embryonic cells which develop into cancer. But such an explanation seems strained and improbable, and cannot be left unchallenged. How much more probable seems the explanation that cancer is an infectious disease, and, like many other infectious diseases, claims its victims in increased ratio among those who, by the exigencies of life in the struggle against natural obstacles in a new country, are most exposed to infection.

The high cancer rate of the Germans and Poles confirms the concentration shown by the map in the German and Polish wards. The low rate among Italians also agrees with the relative freedom of the Italian quarter from cancer shown on the map.

Age Distribution. The age distribution for the 2299 cases of malignant disease is shown in Table V. Nothing new is shown by this table. The well-known infrequence of cancer in the early decades of life is shown. The first decade shows a higher mortality than the second, due to the greater frequence of sarcoma in the earliest years of life. The greatest mortality occurs during and after middle life, 52 per cent. of the cases occurring in the sixth and seventh decades and 70 per cent. in the fifth, sixth, and seventh decades. The mortality rate from cancer increases after middle life for each succeeding decade, though the absolute number of cases diminishes after the sixth and seventh decades, due to the smaller number of persons living to these advanced age-periods.

TABLE V.

Age distribution.

Age.					Male.	Female.	Both.
0 to 9 years	.	.	.	.	12	6	18
10 " 19 "	.	.	.	.	1	5	6
20 " 29 "	.	.	.	.	25	19	44
30 " 39 "	.	.	.	.	60	143	203
40 " 49 "	.	.	.	.	152	275	427 = 18 per cent.
50 " 59 "	.	.	.	.	252	357	609 = 26 "
60 " 69 "	.	.	.	.	266	332	598 = 26 "
70 " 79 "	.	.	.	.	141	181	332 = 13 "
80 " 89 "	.	.	.	.	28	39	67
90 " 99 "	.	.	.	.	1	3	4
Not stated	.	.	.	.	0	1	1
Total	.	.	.		938	1361	2299

(the bracketed note at right: 427 = 18 per cent. } = 70 per cent.)

Sex Distribution. Table IV. shows the sex distribution of the 2299 cases of malignant disease generally and for each important race and race-group. Fig. 2 represents graphically for the entire period the number of males to females, the latter taken as 100, for several races and classes of the population. A remarkable difference of sex proportion is thus shown between the Germans and Poles, on the one hand, and all other classes of the population, on the other. The Germans

FIG. 2.
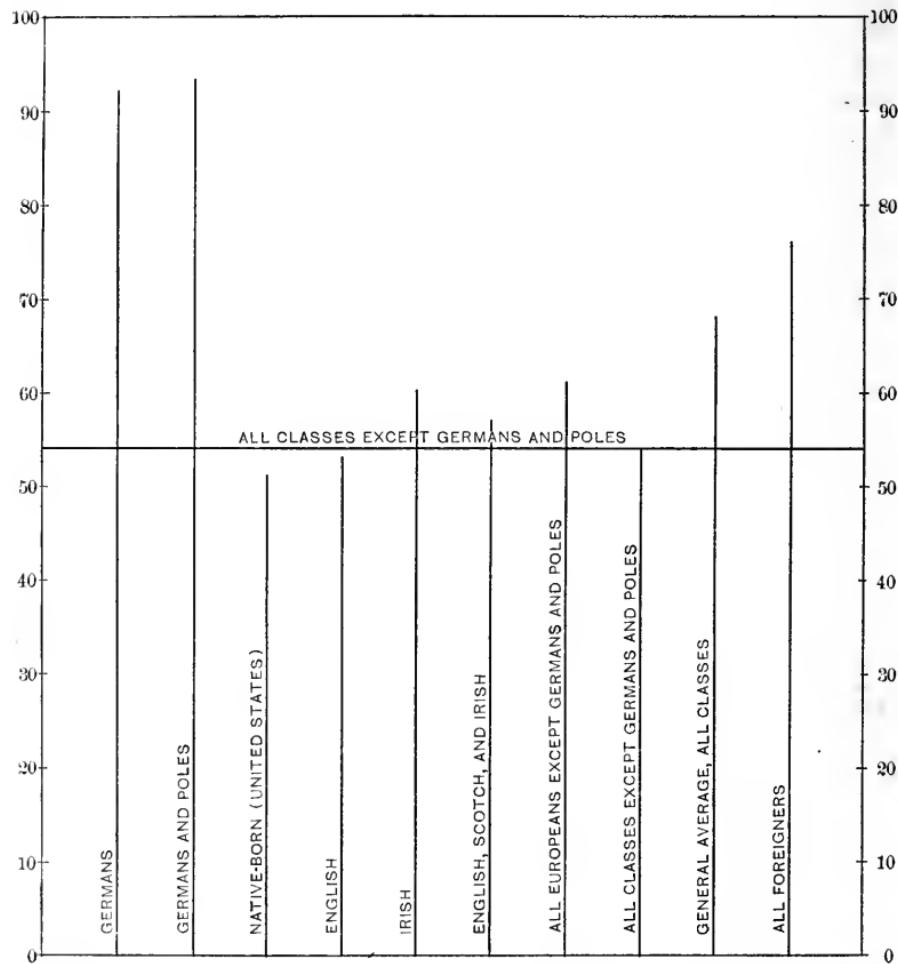
Showing the male to female mortality, the latter taken as 100, from malignant disease for different classes of the population in Buffalo for the period 1880–1899.

and Poles stand, as a class by themselves, apart from all other nationalities in showing a male rate closely approximating the female rate— 93 : 100. All other nationalities show a much lower male rate, ranging from a minimum of 51 : 100 for the native born to a maximum of 61 : 100 for all Europeans exclusive of Germans and Poles. The common text-book statement that cancer is twice as frequent in females as

in males is thus confirmed for the native born (51 : 100), and is approximately correct for every other class except Germans and Poles.

As the United States census of 1890 did not classify its mortality statistics by race, it is not possible to make a comparison of the sex ratios of the different races for Buffalo and the United States as a whole, and this can be done only for the two general classes of population, the native born and the foreign born. For these general classes the ratios closely agree for Buffalo and for the United States, as follows: Native born, Buffalo, 51 : 100; United States, 53 : 100; foreign born, Buffalo, 77 : 100; United States, 79 : 100.

FIG. 3.
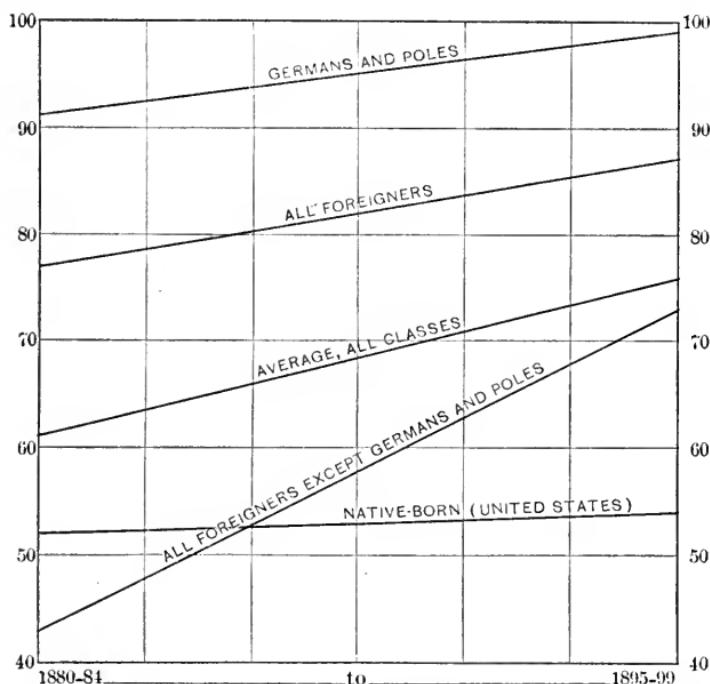
Showing the increasing proportion of male to female mortality, the latter taken as 100, from malignant diseases for different classes of the population in Buffalo, from the period 1880–1884 to the period 1895–1899.

We can find only one satisfactory explanation of the very high male rate in the Germans and Poles above other classes in the fact that cancer of the stomach, which is more common in males than in females, is particularly frequent in Germans and Poles, whereas cancer of the uterus and breast in females is much less frequent among Germans and Poles than among the native born (see *Anatomical Distribution*). The correlation of these factors with the sex ratio of cancer is apparent. That the peculiarly high male cancer rate in the Germans and Poles is not dependent upon a preponderance of males in these races in Buffalo is rendered very probable by the fact that though the Germans and

Poles constitute 57.5 per cent. of all foreigners in Buffalo, the proportion of males in the foreign-born population of Buffalo (51.38 per cent.) is almost identical with the proportion of males in the entire population of the United States (51.21 per cent.).

Fig. 3 shows the increasing ratio of male to female mortality for different races from 1880–84 to 1895–99. An actual increase in the male rate is shown for each class. The increase is marked for all foreigners, and so slight as to be almost insignificant for the native born. An increasing male rate has been noted generally in European countries, and has been attributed to increasing frequence of cancer of the stomach and internal organs in males. The very slight increase in the male rate in the native born in Buffalo probably indicates that there has been little relative increase of cancer of the stomach in the native born.

Anatomical Distribution. Table VI. includes a general classification of all malignant cases according to their general variety and according to whether or not the anatomical location was stated in those classed as cancer. The term cancer, as here used, includes only carcinoma and epithelioma. Table VII. shows the anatomical distribution by organs of all cases of cancer in which the site was stated, separately for all classes combined, for those born in the United States and for those born in Germany (and Poland).

TABLE VI.

Classification of cases of malignant disease according to general variety, etc.

	1880–1889.		1890–1899.		1880–1899.		
	Male	Female	Male	Female	Male	Female	Both
Cancer, anatomical location stated .	191	306	526	760	717	1066	1783
Cancer, anatomical location not stated	100	150	23	57	123	207	330
Malignant tumor, variety not stated .	16	21	19	22	35	43	78
Sarcoma	7	7	56	38	63	45	108
Total	314	484	624	877	938	1361	2299
Total	798		1501		2299		

The striking facts shown by Table VII. are the high rate of cancer of the stomach in the Germans and Poles (43.8 per cent.) compared with those of native birth (21 per cent.), and, on the other hand, the low rate of cancer of the uterus and breast in females born in Germany and Poland (34.4 per cent.) compared with females born in the United States (61.6 per cent.). The correlation of these factors with the sex ratio of cancer for the two races has already been noted. As the sex ratio of cancer for Germans and Poles differs widely from that for all other nationalities, it is probable that other foreign races in general

TABLE VII.

Anatomical location in cases in which the location was specified.

Organs involved.	All races. Males.	All races. Females.	All races. Both.	Native born (United States). Males.	Native born (United States). Females.	Native born (United States). Both.	Germans and Poles. Males.	Germans and Poles. Females.	Germans and Poles. Both.
Genital organs { male / female { uterus / other	1.3	33.0 }34.7 / 1.7	19.7 }20.7 / 1.0	2.0	44.6 }47.6 / 2.9	30.7 }32.8 / 2.0	0.5	23.5 }24.5 / 0.9	12.4 }12.9 / 0.5
Breast	0.5	14.5	8.9	0.6	17.0	10.9	0.8	10.9	6.1
Urinary organs { kidney / bladder	0.4 }2.2 / 1.8	0.6 }1.3 / 0.6	0.5 }1.6 / 1.1	0.6 }2.0 / 1.3	0.0 }0.5 / 0.5	0.2 }1.0 / 0.8	0.2 }1.9 / 1.6	0.2 }0.9 / 0.7	0.2 }1.4 / 1.1
Upper alimentary canal { mouth / tongue / jaw / throat	0.8 / 2.3 }9.7 / 2.5 / 4.0	0.1 / 0.2 }1.5 / 0.2 / 0.7	0.4 / 1.1 }4.8 / 1.2 / 2.0	0.6 / 2.0 }11.3 / 5.3 / 3.3	0.0 / 0.5 }1.4 / 0.2 / 0.5	0.2 / 1.0 }4.5 / 1.8 / 1.4	0.2 / 0.8 }7.4 / 1.6 / 4.6	0.2 / 0.0 }0.9 / 0.0 / 0.7	0.2 / 0.3 }4.0 / 0.7 / 2.6
Middle alimentary canal { oesophagus / stomach	4.1 }51.8 / 47.6	0.1 }25.5 / 25.4	1.7 }36.1 / 34.3	2.6 }40.0 / 37.3	0.0 }13.7 / 13.7	0.8 }21.9 / 21.0	6.0 }58.9 / 52.8	0.2 }35.9 / 35.7	3.0 }46.8 / 43.8
Lower alimentary canal { intestine / rectum	5.1 }12.4 / 7.2	3.8 }8.1 / 4.3	4.3 }9.8 / 5.4	6.6 }18.6 / 12.0	2.6 }6.8 / 4.1	3.9 }10.5 / 6.6	4.4 }9.9 / 5.5	5.4 }8.9 / 3.4	4.9 }9.3 / 4.4
Abdominal organs (not otherwise included) { liver / other	12.1 }17.9 / 5.8	11.6 }15.7 / 4.1	11.8 }16.6 / 4.8	12.0 }19.3 / 9.3	8.6 }13.4 / 4.7	9.7 }15.9 / 6.1	11.8 }16.5 / 4.6	13.3 }18.8 / 5.4	12.6 }17.7 / 5.0
Thoracic organs { heart / lung	6.0 }0.4 / 0.4	0.0 }0.6 / 0.5	0.0 }0.5 / 0.5	....	0.0 }1.4 / 1.4	0.0 }1.0 / 1.0	0.0 }0.5 / 0.5	....	0.0 }0.2 / 0.2
Head and face	5.1	1.5	3.0	6.6	1.1	2.8	4.1	1.7	2.8
Neck	3.6	0.2	1.6	2.0	....	0.6	3.5	0.4	1.9
Extremities	1.5	0.5	0.9	3.3	0.5	1.4	1.3	0.7	1.0
Other locations	....	0.4	0.2	....	1.1	0.8	....	....	....
Total organs involved	767	1121	1888	162	352	514	384	420	804
Total number of cases	717	1066	1783	150	334	484	363	403	766

may be classed with the native born, as opposed to the Germans and Poles, in showing also a low rate of cancer of the stomach and a high rate of cancer of the uterus and breast. This is probable, but cannot be positively affirmed, as the total number of each other foreign race in our statistics is not sufficiently large to warrant us in making tables of anatomical distribution by race and in drawing conclusions from them.

The Germans and Poles, then, stand out in sharp contrast with the native born and probably other foreigners in showing a remarkably high rate of stomach involvement and a correspondingly low rate of involvement of the uterus and breast. Cancer of the stomach relatively to cancer of the other organs was 2.08 times more frequent among Germans and Poles (43.8 per cent.) than Americans (21 per cent.). As cancer in general was 4.81 times more frequent in Germans and Poles than Americans (see above), cancer of the stomach was therefore 10^1 times more frequent in a given number of Germans and Poles than in the same number of Americans in the city of Buffalo.

Such a relative frequence of cancer of the stomach in the Germans (and Poles) compared with the Americans is remarkable and requires a careful investigation of its cause. As the United States census of 1890 did not classify by races (birthplace) we are unable to compare the high rate of stomach involvement in the Germans in Buffalo with the rate for the Germans in other American cities. We have also been unsuccessful in our efforts to obtain official German statistics, and thus to compare the rate of cancer of the stomach for Germans in Buffalo with the rate for Germans in Germany. A careful personal search at the Surgeon-General's Library in Washington for such statistics proved fruitless. We are therefore left to deal with the rates for Buffalo only, unable to compare them with the rates for other American cities and for Germany. It seems probable, however, that a high rate of cancer of the stomach in Germans will be shown generally, wherever statistics may become available. A high rate of stomach involvement is shown by both males and females among the Germans, indicating the participation of each sex in the conditions operating to elect the stomach as the seat of invasion by the cancerous process. The male, however, always predominates in all races in the rate of stomach involvement in cancer.

What significance has the remarkable frequence of cancer of the stomach among Germans in the question of the nature and origin of cancer? The coarseness and quantity of the German's diet could be claimed, perhaps, to account for some increase of stomach involvement on the embryonic theory, but these simple factors seem most insuf-

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[1] As the rate 4.81 is subject to some reduction on account of the higher average age of the foreign born than the native born (see above) so also the rate 10 must be proportionately reduced for the same reason.

ficient to explain the high figures that we have shown. The parasitic theory here again seems to harmonize best with the facts. Does it not seem likely that the stomach is the seat of cancer invasion because it is directly infected by contaminated food, and that the peculiar diet of the Germans is more subject to such contamination than the food of Americans or other people? In this connection it is well to recall the observations of Behla, at Luckau, and the suspicion that he entertained against raw, uncooked garden vegetables as the carrier of cancer infection. In the cancer suburb of Luckau also, as well as among the Germans dying of cancer in Buffalo, cancer of the stomach and liver predominated. The apparent relation at Luckau between cancer and the location of a foul ditch is lacking in Buffalo to account for the contamination of the garden vegetables.

If the German's stomach is far more exposed to infection than other organs, we have at least a partial explanation of the low rate of cancer of the uterus and breast in Germans. The lower rate of cancer of the uterus and breast in German than in American women seems to us to be a weighty argument against the embryonic theory, as it is well known that the birth-rate and habit of nursing at the breast are greater among the Germans than the native born, and, therefore, if the embryonic theory were correct, cancer ought to be more frequent rather than less frequent in these organs in Germans because of their relatively greater use and exhaustion. The reverse is shown to be the fact.

The special facts that we have found in the peculiar cancer distribution in Buffalo may be due partly to local conditions that may not be found entirely similar in other American cities and towns, and hence it may be that the special relations of cancer to race, sex, etc., found to exist in Buffalo may not be entirely confirmed elsewhere. It seems likely, however, that the general result of our study in Buffalo will be confirmed, in the main, in other American cities in which the conditions of population, race, social status, etc., are generally similar to those existing in Buffalo. Special conditions will undoubtedly be found in each city that will determine the special local peculiarities of cancer distribution, and we believe that the labor and time spent in studying the local conditions influencing cancer distribution in different places will be repaid by results commensurate with the task involved and possibly of great import to the successful direction of the attack against the cause of this scourge of humanity.

In conclusion, lest we may have been misunderstood, may we make clear that we have regarded Behla's theory of infection through contaminated raw vegetables not as a truth which we accepted, but merely as an interesting hypothesis, possibility, or suggestion worthy of consideration in speculating upon the cause of the peculiar cancer distribution and remarkable frequence of stomach involvement shown by the

Germans? In fact, we are far from assuming the truth even of the parasitic origin of cancer until further and more convincing evidence than hitherto adduced is brought to sustain it. So many possibilities of error in fact and judgment may enter into a problem so difficult and complex as this that our attitude should be one of conservatism and caution toward all claims and theories until they are supported by unimpeachable testimony and evidence that compel conviction. On the other hand, let us not confuse prejudice with just conservatism or refuse to give our attention to new possibilities that offer even a hope of solving a problem that has baffled solution on any of the other theories. It is in this spirit that we offer the evidence that we have been able to collect, as a mere contribution to the question of the nature of cancer—tending, we are inclined to think, to support the theory of parasitic origin.

Summary. We may briefly summarize the principal facts and results of our study as follows:

1. The house distribution of cancer on the map shows an area of marked concentration in the German wards. No other relation than that of race can be determined to exist between this area of concentration and local conditions.

2. That there is a real relation between this local concentration and race (German) is further indicated by the race table, which shows that cancer is many times more frequent among the foreign born, and particularly the Germans, than the native born. The latter fact is also verified by the United States census for twenty-eight large cities. The cancer rate of foreigners in general in Buffalo was 4.59 times the rate for the native born, and the corresponding rate for Germans (and Poles) was 4.81.

3. The Germans (and Poles) were further specially distinguished from other classes by the high rate (43.8 per cent.) of involvement of the stomach, 2.08 times the rate (21 per cent.) shown by the native born. Cancer of the stomach, therefore, was 10 times more frequent in the Germans (and Poles) than in the native born in Buffalo, for equal numbers of each. Such high figures seem hard to explain on the embryonic theory, and tend to support the parasitic theory of cancer by supposing that the peculiar diet of the Germans is more liable to contamination with the parasite of cancer than the more ordinary diet of other classes. Cancer of the uterus and breast in Germans (and Poles) was correspondingly low, being hardly more than half as frequent as in the native born. This fact seems to be a further argument for the parasitic as opposed to the embryonic theory, considering the facts that the birth-rate and the habit of nursing at the breast (conditions predisposing to degeneration of these organs) are greater among German than native-born women.

4. The ratio of males to females, the latter taken as 100, was 93 for Germans (and Poles) and from 51 (native born) to 61 (all Europeans except Germans and Poles) for all other races and classes. The high German male rate is probably directly dependent upon the high rate of cancer of the stomach (especially in males) and the low rate of cancer of the uterus and breast (females) found to characterize the German as opposed to other races.

For all classes the ratio of males to females was found to have risen during the twenty years covered by the investigation. This rise was very slight for the native born.

5. An increase in the general cancer rate from 32 to 53 per 100,000 of population (65 per cent.) took place from 1880 to 1899. A similar increase has been shown in all countries. This increase is partly real and not entirely apparent. The rate of increase is shown to depend, in part at least, upon changes in the proportion of the foreign born, because the cancer rate in the foreign born is so much higher than in the native born.

CHRONIC MYOCARDITIS AND FATTY DEGENERATION OF THE HEART.

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Clinically these two expressions of cardiac degeneration are frequently most difficult to differentiate accurately. We have our suspicions based upon a fair interpretation of the case as a whole, and sometimes the results of the autopsy justify our probable diagnosis. Many times we believe we shall find not merely fibroid changes or, indeed, simple fatty degeneration, but there will be a combination of both changes. In the advanced forms of fatty change particularly, and whenever we have in the history of the patient efficient causation of such alteration, our belief in its existence is very positive. There are, however, numerous instances in which our diagnosis during life is at best very problematical, and yet it seems to me any other diagnosis of what we observe falls short of seeming truth and is at best somewhat unsatisfactory to the practitioner. While we know, for example, in the graver forms of anæmia, and notably in the so-called pernicious form, fatty degeneration of heart muscle is no uncommon finding, I do not believe that physicians are apt to consider that the heart may be structurally affected in the simpler forms.

It is true that many symptoms point to cardiac weakness. Notably we would put emphasis on lowness of the heart sounds at times, on extreme rapidity of its beats, with sensations of fluttering and cardiac

distress. Sometimes there is a systolic murmur which covers in part or wholly the normal sound. Frequently this is absent. Attacks of dizziness or faintness may come on readily and repeat themselves with little or no sufficient cause. I have seen such an attack where the patient was unconscious for a period of half an hour or more. During this period the pulse was very faint, sometimes almost imperceptible at the wrist. There was occasionally a lapse of pulsations at the wrist for one or two cardiac beats, accompanied with marked irregularity. The extremities were cold, the respiration shallow and suspirious. After such attacks and when the patient's strength had partially returned there was no enlargement of the heart which could be discovered, no abnormal pulsations either on the chest or in the neck, and no venous hum in the jugulars.

I am of the opinion to-day that such cases often mean beginning cardiac degeneration of the fatty type, and that any other interpretation inadequately expresses the best medical judgment. Of course, they require iron and arsenic to re-establish the blood condition. They are also temporarily benefited at times by the use of intestinal antiseptics ; still, in order to bridge over the acute attacks we must give cardiac stimulants freely and repeatedly and aid with the heart tonics of strophanthus and strychnine judiciously administered. Oxygen also given systematically is of great help and must be insisted upon.

We all feel we know the usual gouty heart fairly well, viz., the heart affected with moderate hypertrophy of the left ventricle and adjoined to evidences of more or less fibroid changes in the kidney and general arterio-capillary circulation. Whenever this hypertrophy is no longer thoroughly compensatory and evidences of heart weakness develop, as shown by local and general signs and symptoms, we are frequently brought to the position of asking ourselves whether cardiac degeneration be present, and if so, its extent, variety, and nature.

Our diagnosis must be determined by several considerations independently, perhaps, of the underlying and evident gouty changes. It may be that the patient has been a free liver, is of corpulent frame, and has indulged more or less and for a considerable time in the use of alcoholic stimulants.

These conditions would tend to make us reasonably sure of the presence of some fatty degeneration of muscular fibre. The condition also of the liver, notably where it is torpid and enlarged and there is possibly some additional abdominal enlargement, with tension of the parietes, would make us suspect cirrhotic and fatty changes in this organ. The presence of ascites may remain doubtful for weeks and months, and never, indeed, be accurately determined. Again, in a relatively short period succussion and palpation may unquestionably reveal abdominal effusion in small or moderate quantity. In these

instances the pulse may never have increased tension, or only to such slight degree that our tactile sensations, or even the use of the sphygmograph, may not corroborate our suspicions, but simply leave us in reasonable doubt. Here, again, it is the skilful touch, the keen appreciation of local changes which proceeds from long, careful experience, or the expert and, may be, repeated use of the sphygmograph which shall solve our difficulty. In any event, but particularly where our findings are positive, we believe that we shall detect an excess of fibroid tissue in the heart in certain spots between atrophied, compressed, or degenerated fibres.

The cerebral symptoms, which may be passing or more or less permanent, while pointing to cardiac degeneration, do not tell us positively whether the fibroid changes or fatty ones are predominant. If the mental activity of the patient has failed slowly and evidently for many months, if the memory be impaired, somnolence increasing, and even slight mental exertion be accompanied by great fatigue, slowness and difficulty of speech and obvious lethargy, we are inclined to the opinion of marked fatty degeneration, always supposing the other signs and symptoms mentioned are present. If now the arterial tension remains high the coats are visibly thickened, knotty, tortuous, giving proof of decided atheromatous changes, we are prone to believe that the intracardiac condition will be more likely that of chronic myocarditis, with marked fibroid changes. Any calcification of the arteries, as of the radial or temporal, will only accentuate and confirm this judgment.

This condition we should not find except in very rare instances, unless the patient were one already of advanced years or the gouty dyscrasia were intense and of hereditary origin increased by bad habits of life, speaking mainly from the hygienic stand-point.

In some instances we are led to believe that on autopsy we should find the coronary arteries notably affected. These examples are especially those in which præcordial pain and anxiety had been evident at times and with moderate or great intensity.

I saw a patient, not long ago, a professional man, about fifty-five years old, who gave the following history: He had been a careful liver so far as food and alcohol were concerned, but had for many years smoked immoderately and kept late and irregular hours. He had done much hard work in active professional life and in a literary way. He had for many years been a chronic dyspeptic, showing itself by slowness and impairment of digestion, belching of wind, and capricious appetite. He had never suffered from symptoms of heart weakness or distress. Calling to see him, I found him pacing the floor, with marked dyspnœa, præcordial distress and great mental anxiety, and the feeling of impending disaster. The hands were cold and the face blanched; the pulse was regular and tolerably full; the radial arteries were thickened and there was apparently increased tension; the heart was enlarged, showing hypertrophous dilatation, moderate in amount. This

attack had lasted twelve hours without relief spontaneously, and was increasing in intensity, as shown by the augmented distress. The swallowing of numerous soda-mint tablets, which frequently gave relief to simple dyspeptic conditions, were of no avail.

I prescribed immediately a heart tablet of strophanthus, digitalis, atropine, and nitroglycerin, and in a few hours there was great relief. The urine during the attack was high-colored and concentrated, but contained neither albumin nor sugar. In a few days he was about as usual. I advised repose from work and careful dietary, with the use of cardiac stimulation if required. In a short while he was better than he had been in many months and had had no recurrence of his anginose symptoms.

No doubt, to my mind, this patient has intracardiac changes, probably of the fibroid type. It is probable also that his coronary circulation is defective and that endarteritis is present. Did he have some temporary and incomplete obstruction of one or other of these arterial branches at the time of his attack ? This I believe, although I cannot affirm it. I only know that no other diagnosis is sufficient to explain his symptoms satisfactorily. Probably the causes enumerated were all more or less contributory to the development of the attack. Judging by the sequence of events, I believe that nervous tone to the heart was partially restored by relative rest from work and that the stomachal condition was improved by appropriate dietary. The use of the cardiac tablets during the attack certainly gave marked relief and possibly prevented a fatal termination due to complete clogging of one or both main arterial coronary branches.

I have known of the case of another professional man, about fifty years of age, whose habits were not different from those of many tolerably successful ones at this period residing in a large city. He worked moderately, but not unduly; he ate and drank with proper selection and due regard for his habits and peculiarities; he gave himself a fair amount of recreation, took long summer vacations, and was fond of the water and yachting. At times he had very slight attacks of dyspnœa and præcordial anxiety, which never meant absolute pain or great distress; indeed, these mild attacks occurred at infrequent intervals and disappeared spontaneously and in a few minutes or hours at most. One afternoon, hastening home from his boat on the river to dine and meet his wife, who was anxiously awaiting him, as he was late, he had an attack of severe angina pectoris and died suddenly in the street.

The following description of the cardiac changes found at the autopsy is copied textually from notes kindly given me by the pathologist:

Moderate degree of hypertrophy of left ventricle. Valves competent. Atheroma in mitral valve and in beginning of aorta. In latter situation this is most abundant about origin of coronary arteries, whose lumen is distinctly encroached upon by it. On opening of coronary arteries atheroma is found in their walls extensively beyond their origin. In this way their calibre is considerably narrowed. Microscopical examination of heart muscle reveals increase in pigment in cells about

nuclei and a slightly granular condition of muscle-cells generally, but no distinct fat. There is no obscuration of transverse striæ and there is *no increase in fibrous tissue.*[1]

Analogous instances to this are not infrequently met with. Of course, the precise nature and the degree or intensity of the signs and symptoms experienced during life vary greatly. In a similar manner the rapidity or suddenness of the fatal termination, if it occur, varies also very much. Whenever the coronary circulation is immediately and wholly obstructed sudden death takes place and one of several findings is evident at the autopsy. It may be that the coronary artery is filled up with an embolic plug, which has its origin in the heart either from a cardiac thrombus or from a detached portion of vegetation from a diseased valve or cusp of the mitral or aorta. In such cases the coronary arteries may be relatively free of disease, although frequently there may be even here a concomitant condition showing local degeneration, though slight in amount. Wherever—and this occurrence is much more usual—the coronary arteries themselves are more diseased, showing inflammation, thickening—endarteritis, in other words—or pronounced atheroma, with possible calcification at certain points, they are occluded with a thrombus.

The arteries may be occasionally affected and narrowed mainly or entirely at their orifices, or, what is truer ordinarily, the coronary arteries are thickened, tortuous, atheromatous, or calcified throughout the larger portion of their distribution. These changes have, of course, greatly decreased their lumen or the extent of their calibre internally, so that the heart has been imperfectly nourished by an insufficient blood-supply for a long period, and at a given moment a thrombus forms locally and almost inevitably, and a fatal result ensues, although, of course, in a somewhat less rapid manner than if an embolus has been the immediate and efficient cause of death.

The local changes of the heart muscle in these latter cases particularly partake of a fatty or fibroid character and are more or less localized or disseminated in their distribution, according to modifying general conditions. Moreover, the time during which the changes have taken place and the age of the patient have much to do with the character of these changes. As I have already pointed out, it is almost impossible prior to death and direct examination of the heart to state positively just what shall be found, so far as the precise changes or the limitations of the morbid involvement of the coronary arteries and heart muscle are concerned.

In old valvular troubles of the heart, whether they be of the nature of stenosis or regurgitation, in chronic pericarditis where the adhesions

[1] The findings at autopsy are here unusual, in that there was no occluding thrombus and the muscle changes are slight.

are tough and fibrous, in an advanced condition of hypertrophy of the heart, with probably much cardiac dilatation, fatty degeneration is almost surely going to occur at a given time, provided the patient's life is sufficiently prolonged; then, of course, notable cardiac weakness, præcordial distress and dyspnœa, cyanosis, infiltration of the lower limbs, weak, unequal, and irregular pulse, deficient and concentrated urinary secretion, are some of the numerous painful phenomena with which we are all familiar.

In these cases we naturally expect and usually find post-mortem far more disseminated degenerative changes of the heart muscle than we do in the instances previously cited. As a rule, the left ventricle, and more particularly the portion of it near the septum, is specially affected. The columnæ carneæ—the papillary muscles—are frequently reduced in size, changed in color, soft to the touch, possibly giving a greasy feel, easily torn or lacerated, and showing to the naked eye indubitable evidences of fatty degeneration which microscopical investigation will merely serve to reaffirm.

The right ventricle may also be degenerated in parts, although less frequently, and it is now known that the auricles are sometimes in a certain degree degenerated, although this statement was formerly denied.

If there be chronic myocarditis present, which occasionally occurs, the heart muscle is hard and resistant in spots and very often diminished in thickness where this exists, owing to the deposit of fibrous tissue which has practically caused many muscular fibres to atrophy, degenerate, or almost or completely to disappear.

In those corpulent people who have accumulated flesh continuously, slowly, and in large amount, the heart is no exception to the great number of viscera which become more or less involved. The deposit of fat upon and around the heart usually seeks at first those regions where fat is deposited to some extent normally, and particularly in the grooves between the auricles and ventricles and along and over the intraventricular septum. Later, it is no uncommon finding to discover fat under the epicardium or the endocardium. Whenever this occurs the fatty infiltration has extended deeply into the heart muscle and between the muscular fibres to such an extent that the force of the heart-beats is notably lessened, and many of the phenomena which characterize true fatty degeneration of the cardiac muscle are present during life. Not a very long time passes under these circumstances, unless treatment is effective in checking the accumulation of fat in the tissues, until the fat deposited penetrates the muscular fibres themselves and produces true fatty degeneration of the heart.

These obese persons are, therefore, always a source of special solicitude to us when we take care of them in any of their ills. All acute

diseases in their instance are of moment, and what would be a relatively simple affair with a thin person or one with only moderate or healthful embonpoint is apt to take on a certain degree of gravity. A slight bronchitis, an attack of influenza, a mild rheumatic seizure, or a limited attack of acute pleurisy will almost invariably lessen their bodily strength very rapidly, and soon their respirations are much quickened, their pulse becomes rapid and weak, and their cardiac action so feeble as to require immediate and frequent stimulation. The only way to treat such patients safely is to suppress all bodily exertion as much as possible for a time and to lessen, if feasible, their mental cares and anxieties. Even without any marked febrile movement they should be put to bed and kept there until the acute attack, whatever it be, has completely passed, during several days at least. Of course, if there be marked febrile reaction the urgency and necessity of this action on the part of the attending physician is even far more imperative; and here it is well to remark that in such cases, as frequently the rise of temperature is often only slight or moderate, the patient's immediate and nearest relatives are not at all alarmed, and not infrequently consider the wise and careful, conscientious physician a great alarmist when he is merely obeying his best judgment if he insists absolutely upon the importance of following out strictly his orders.

At first in some of these cases, and leaving out attacks of acute trouble for the while, the careful examination of the heart physically will not permit us to affirm that there is any notable cardiac enlargement; and even the heart sounds, when the patient is in his usual health and free from physical exertion and not harassed with business or other cares, will not show any special weakness, irregularity, or notable murmurs; but often very slight exertion—as going up stairs, climbing a hill, hastening, even an ordinary walk on level ground—causes distress, and they will be in a panting condition almost immediately, become dizzy and faint, and the face is suffused with an undue pallor or else their cheeks and eyes are congested and their lips are blue and cyanosed. These cases we all see—we meet them every day—and often, I am sorry to say, do not guide and direct them intelligently.

If the person affected with obesity is young I do not believe, as a rule, that the immediate outlook of the case from a cardiac stand-point has usually much gravity; and yet even then we must not ignore the possible outcome and the danger of dilatation of the heart resulting—more or less lasting and important—unless we insist upon proper dietary, exercises, and judicious medication. But in women, near the climacteric especially, and in men near or past middle life, we cannot be too formal about our protests to be careful and heed judicious medical counsels; otherwise we shall have soon to deplore an evident cardiac

enlargement and dilatation, which from a prognostic stand-point is certainly very grave, as the underlying cause is often fatty degeneration of cardiac muscular fibre, and in view of the age and condition of the patient is very difficult, not to say impossible, to remove.

In young girls, particularly, obesity is apt to follow acute disease like scarlet fever or typhoid and to be allied with chlorosis. This anæmia is sometimes corrected by proper treatment without too great lapse of time; again, it is most persistent and resists all our efforts for months and years. During this period such girls are liable to syncopal attacks and other symptoms which surely indicate pronounced cardiac weakness and cause much distress and anxiety to all concerned—patient, relatives, and physician. In older patients the blood may be of relatively good quality and not seemingly add to the distressing or merely uncomfortable symptoms.

In some women who have profuse menstruation; in those who are married and have had several children; in women at the time of the menopause—the amount of blood often lost at the monthly flow is excessive, and the result is that the bodily strength is greatly diminished and the blood examination shows great diminution in hæmoglobin and the number and appearance of the red cells.

Here, again, I have no doubt that the anæmia thus produced hastens considerably fatty degeneration of heart muscle and the subsequent development of cardiac dilatation. In these instances, if for some reason the patient is obliged to submit to an operation and take an anæsthetic, of course the attending physician, surgeon, and, above all, the giver of ether or chloroform or even nitrous oxide should be particularly careful. In uterine fibroids which require operation I would urge more than ordinary solicitude in administering anæsthetics, and especially in corpulent women about middle age. These women are affected with several conditions which are apt to produce fatty degeneration of the heart. It may be that prior to the operation the heart had been thoroughly examined and was declared competent and probably free from more than a considerable degree of fatty *infiltration,* making part, as it were, of the increased fatty accumulation in the body not only in the cellular tissue under the skin, but also of several of the other viscera. During the course of the anæsthesia, however, and subsequent also to the operation, general phenomena of cardiac weakness showed themselves, which, without doubt, at times hastened or, indeed, occasioned the fatal ending of the case.

Whether under these circumstances, as in one unfortunate case I have in mind, the cardiac failure would at all explain the rise of temperature and local evidences of peritonitis which developed, or whether these latter phenomena were merely due to some imperfection in the operative technique, or, indeed, to penetration and absorption of septic

material in the abdominal cavity, I am not wholly convinced. What we do know is this, viz., when a sudden and great loss of blood occurs, accompanying the severe shock to the nervous system, and indeed the whole organism, inseparable often from the results of a very severe operation, conditions arise which may readily serve to explain increased temperature, paralysis of the bowels, local congestions of intense degree leading rapidly to inflammation, the formation possibly of purulent infiltration, and death.

Our overwrought theories of microbic infection, it appears to me, make us partially blind to the broad notions of general pathological physiology, which I am confident will outlive narrow and confined notions of the origin and development of disease, and so it may be in the case referred to.

In no condition do we dread more the development of fatty degeneration of the heart than in that of chronic alcoholism. In all acute diseases, but particularly so in the pneumonia of adults, when we know we have to do with a chronic alcoholic, our prognosis of the outcome of the case should always be carefully guarded. No matter how mild the attack may apparently be in the beginning—no matter how hopeful we might be in other cases as to the future course of the disease—in view, perhaps, of the small area of lung involvement and the mildness of the general reaction present, danger is always lurking and may show itself almost at any moment, either during the acute stage of the pneumonia or in the early convalescent period, by sudden pulmonary congestion or œdema, with accompanying heart-failure; or, indeed, the heart itself may rapidly or suddenly cease to beat, and the patient die in a syncopal attack with dyspnœa and apparent asphyxia, or a convulsive seizure resembling closely a so-called uræmic attack. The slightest effort may bring on such a result. Going to stool, raising himself, or turning over in bed without the help of a nurse may be among several efficient causes which bring about instant dissolution. Again, the fatal occurrence may come about without any accidental circumstance whatever to which we would direct attention.

Not only in acute diseases are these statements true, but they are almost equally true when the individual has apparently been in his usual health. Thus it is we hear of many cases of sudden death attributed to so-called heart-failure, which means nothing tangible or obvious, but which should mean fatty cardiac degeneration. If an autopsy is made it will frequently demonstrate the fact beyond reasonable doubt.

In certain autopsies carefully conducted, so far as visible appearances are concerned, a report is occasionally returned that no sufficient cause of death has been discovered. The heart is about of normal size, there is no valvular disease, and the cardiac fibre does not seem notably affected. There is assuredly no pallor of the heart muscle; the heart

may not flatten out on the table and the muscle may not be easily torn or lacerated; indeed, the heart muscle is deeply stained or of more than ordinary deep red coloration. In some instances this staining is due simply to the imbibition of the muscular fibres with the coloring-matter of the blood due to changes caused in this fluid. While this appearance is oftener present in acute febrile disease than it is where no such intercurrent complication has taken place, yet the cardiac appearances may be as I have described them in chronic alcoholics who have died suddenly.

The microscopical examination of the cardiac fibres in these instances, if made—and it always should be made—will not infrequently reveal manifest granular or fatty degeneration of muscular fibres, possibly limited, but more usually disseminated. Whenever the changes are limited we should be careful to examine the condition of the coronary circulation, and frequently there will be found endarteritis or atheromatous changes.

In the senile heart, especially among those persons who have led a moderately careful and regular life, we are more inclined to diagnose fibrous changes than fatty ones if the heart begins to show decided weakness, irregularity, and intermittences. With this condition there may be moderate enlargement—usually hypertrophous dilatation. There may be no abnormal cardiac murmurs, and frequently the pulse, instead of being irregular and weak, may be of good tension and very regular, showing trouble only by a little lack of fulness and undue slowness. Of course, the arterial coats both at the radials and temporals may be thickened, tortuous, and stand out prominently, owing to the shallow layer of subcutaneous cellular tissue.

The urine in these cases may be in fairly good quantity, but is ordinarily of somewhat low specific gravity, without sugar or albumin. An occasional granular or hyaline cast is often discovered. With a tendency to constipation, which often exists, the quantity of urine eliminated in twenty-four hours will sometimes be decidedly below normal.

With any little fatigue, with any slight error of diet, with any prolonged exposure, with any excessive heat or cold, with any rapid change of temperature even, these old people are apt to feel poorly. They lose appetite, they sleep less well, their bronchial secretion is increased so as to produce annoying cough for some days, they are apt to become lethargic and inclined to doze frequently, and it is not uncommon to have them complain of feeling dizzy or faint. All these symptoms are unquestionably due in some instances at least to certain fibroid changes in the heart muscle. These changes are, however, not usually limited there; they are more or less disseminated everywhere in the arterio-capillary system, and several of the different viscera are notably affected, and particularly is this true of the

kidneys, the liver, and the lungs. We have in these cases the best expression, without doubt, of the general disease so ably described originally by Gull and Sutton and so well added to by the labors of George Johnson and other able writers.

As regards the effect of syphilis in producing cardiac degeneration, either of the fibroid or fatty type, I have very little to say from the point of view of my own personal observation and experience. In a few rare instances, it is true, where the syphilitic poisoning was intense and the constitutional effects had become wide-spread by reason also of its duration I have seen the internal organs evidently much affected.

Syphilitic gummata of the liver I have occasionally observed, and in connection therewith there have been fatty and fibroid changes. Undoubtedly the same products may occur in the heart walls, although very infrequently in the ordinary routine of general hospital or private practice. Its possibility, however, should be kept in view, and where-ever we have to do with those changes in deep-seated organs of syphil-itic origin which clearly show its special virulence we should pay particular attention to the condition of the heart. If there be signs and symptoms pointing clearly to cardiac weakness coming on slowly and increasing constantly it is good clinical conduct to have our mind alive to the possibility of an intracardiac gumma and to the fatty and fibroid changes which may depend upon or result therefrom.

After what I have written, the prognosis and treatment of these structural changes should be considered. In general it may be said that if the process has come on with some rapidity, or if the cause be possible of removal, the prognosis is far less grave, at least prospec-tively, than if the contrary conditions are true. Of course, in the fatty change of the heart, which I believe possibly or probably exists to a certain degree at least in a few anæmic young women, this condition is undoubtedly curable in a shorter or longer time by judicious methods of treatment. If the anæmic state should, on the contrary, become of a more advanced or pernicious type, we all know that while we may and do obtain temporary good effects, which for a while at least may seem to promise a permanent cure, our hopes are apt to be in vain.

This is thus far the history of the medicinal effects of large and in-creasing doses of arsenic and the use of intestinal antiseptics according to the method of Hunter in the treatment of pernicious anæmia. The able and exhaustive report of Cabot before the Association of American Physicians, May, 1900, would serve only to confirm the correctness and sadness of this view.

In all instances, of course, where the anæmic condition and the accompanying cardiac degeneration, probably fatty, depends upon or is occasioned by malignant, incurable disease, so recognized at the present time, we cannot properly hope for any amelioration of the

cardiac changes.   In most instances where the alcoholic habit has been largely instrumental in bringing on signs and symptoms of cardiac fatty degeneration and similar changes in other viscera—if these changes are not too far advanced and if the alcoholic habit be entirely suppressed—we may reasonably hope in many examples for a measurable degree of improvement in the physical condition of the patient and possibly for a complete cure.   This happy result can only be obtained with considerable time, however, and by absolute attention to abstemious habits of life, and, above all, by complete abstention from alcohol in future.   Of course, if the alcoholic habit has been an excessive one and long continued, and if the patient has already reached middle life or passed beyond it, the ultimate outlook of the case is far less hopeful. In this matter, however, personal idiosyncrasy and constitutional tendencies should always be considered and much weight given to their due estimate.

I have known certain individuals to have a pronounced alcoholic habit of many years' duration, and yet during a large portion of the time they have shown no morbid symptoms or signs of special moment resulting therefrom.   When morbid phenomena develop finally in these cases, pointing unerringly to involvement and degeneration of the heart muscle, I still feel a reasonable hope that they may be able to arrest their disease, provided always that I can persuade them to restrain absolutely their alcoholic appetite.

In other cases so soon as the cardiac degeneration is clearly present the onward march of the disease takes place apparently without halt or hinderance.   The march onward and downward may be slow or rapid, but, unfortunately, it is sure, and our best remedial means are ineffective to delay or arrest its course.

In certain obese persons, by a proper system of diet and exercise and suitable cardiac tonics at times combined with the continuous and judicious inhalation of oxygen during weeks and months, we may sometimes obtain very good effects.   The prolonged use of iodide of potassium in these cases, given in moderate doses, always supposing it is well borne by the stomach and eliminative organs (skin, lungs, and kidneys), is in the judgment of many capable observers very useful and takes the place oftentimes of nitroglycerin and the nitrites with great advantage.

A few observations of individuals, young or past middle life, have made me believe that the treatment of Nauheim in well-selected cases and managed with discretion and good judgment and with a mental eye, single and devoted to the best good of the patient, has been unquestionably of great use for a time.   The great risk of this spa treatment, as of all others, resides in the fact that even intelligent, cultivated physicians, here as elsewhere, become in a sense the victims of

their own exaggerated enthusiasm, and when a patient comes under their care they are apt to push their treatment inconsiderately perhaps, and sometimes too far.

Again, it occurs—I have known such a case—an individual past the meridian of life had been sent to Nauheim for treatment by his family physician, and although the patient when he reached the springs was in no condition to go through the spa treatment—or originally, even, he was not a suitable case for treatment, either owing to his preconceived notions or the stress he laid upon carrying out what he was ordered from home to do—led the local practitioner of Nauheim to permit the following up of what perhaps, if his better judgment had acted coolly and deliberately, he would not have permitted, or in another case have only permitted in a very limited measure.

In some cases one treatment at Nauheim may be decidedly useful, but unfortunately has not been completely successful in establishing a cure. Such a patient is sometimes told to return another season, or another, and better results may or will be obtained. This, unhappily, is an error fruitful of bad consequences. The patient has really obtained all the good possible from the saline carbonic-acid baths and the regulated resistant movements. It would have been far better for these persons, in my judgment, if they had remained away from the spa later and if they had sought from other means all the improvement they could fairly hope for.

It is the wise, conscientious physician, who is thoroughly familiar with the personality, habits, and surroundings when at home of these patients, who should really guide and direct them. I say it most regretfully that oftentimes his voice is like as one " crying in the wilderness," and the wisdom of his forethought, wide knowledge, and clear-sightedness is rarely or perhaps never fully recognized. In senile changes of degenerative type affecting the heart, and especially where interstitial fibroid changes occur, accompanied usually, as I have already said, by more or less general changes throughout the whole arterial system, a wise conservatism should always prevail. It is utter foolishness to suppose that we can modify in any appreciable degree what has very slowly and surely taken place, and what is, after all, many times only the outward and visible expression of the progress at times or the result of " anno domini," from which man no more than other animals is exempt.

There is a natural growth and natural decay, and these fibroid changes in the heart and vascular circulation are to be wisely regarded as nature's showing in due season. In such cases, therefore, treat symptoms as they arise with the hope of temporary relief and temporary benefit many times, but no more hope to arrest or change the inevitable permanently than to change the river permanently in its

course by an insignificant and temporary dam. In the fatty degeneration which complicates chronic valvular cardiac conditions, which is either the cause or the result of cardiac hypertrophy or dilatation, something may still be done.

The general nutrition of these patients may be kept up by suitable food, and their emunctories may be properly stimulated when required by baths, diuretics, and gentle laxatives. Breathing pure air and gentle exercise in walking will sometimes prove remedial. The blood should be kept in good condition and tonics may be required. Heart stimulants are often temporarily useful. In the event of evidence that the condition is not progressing favorably, strychnine is advantageous when continued for some time, with occasional interruptions, in moderate doses. Where there is much arterial tension, with marked dyspnoea, iodide of potassium, if well borne, will give temporary relief and occasionally proves permanently beneficial. All sudden or great efforts should be most carefully avoided, and especially is this true in the secondary great hypertrophy which follows aortic regurgitation, whenever the heart shows that its walls have become hopelessly degenerated. In these instances it is that many sudden deaths occur, as the records of our hospitals abundantly show, as well as occasionally experience in private practice.

In cases of suspected syphilitic degeneration affecting the cardiac muscle, iodide of potassium, freely given, or the mixed treatment wisely ordered according to circumstances, should be our main reliance.

In writing the foregoing paper I might have insisted more than I have done upon the purely pathological aspects of my subject. I might, indeed, have given a careful description of pathological findings in these cases at the autopsy when it was made, and especially when made with particular reference to the condition of the cardiac walls and the coronary circulation. To have done so would have lengthened my paper unduly, and would, moreover, have taken away perhaps part of the interest attaching to it as a clinical study, upon which I would place special emphasis.

Having said this by way of an explanation I would now crave attention for a few words from the point of view of the gross and minute lesions present in the cardiac muscles in different instances. Wherever the heart is notably affected with fibroid changes the muscle there becomes tougher and more resistant, besides showing thinning of heart walls in places. In the spots thus affected there is a yellow-whitish coloration, which indicates somewhat the probable nature of the degeneration. This degeneration is prone to occur in patches and especially in certain regions of the left ventricle and near the septum and apex than elsewhere. Under the microscope the parts affected are shown often to be almost wholly composed of fibrous tissue.

In other cases, while the fibrous tissue is in great excess between the muscular fibres, the latter still are present but atrophied or degenerated more or less. The nucleus has sometimes disappeared as well as the striæ, and there may be more or less pigmentary deposit in the form of granules, regularly or irregularly distributed. Wherever the nucleus of the muscle still exists the pigmentary granules are apt to be present in larger numbers about it than elsewhere.

The primary fibres are occasionally almost homogeneous in appearance. Alongside of fibres much atrophied or degenerated there may be others relatively healthy.

In chronic fatty degeneration of the heart muscle, especially if it is at all advanced as to its stage, the color of the muscle is notably pale and yellow in places. Sometimes, however, where the changes are not so far advanced, at least in spots, but more generally disseminated, the heart muscle, particularly of the ventricles where the degeneration is most pronounced, is less changed in color from the normal. However, in these instances the muscle has lost its consistence, is very flabby, and the heart flattens out and loses somewhat its healthy outline on the table; beside it has lost resistance and is easily torn and lacerated. Under the microscope the diseased fibres may show very numerous granules, or at an ulterior stage these granules may be replaced by many glistening, shiny, very refringent round bodies of large calibre, which evidently are oily or fatty. Here, again, the nucleus of the muscle may or may not have become degenerated or have disappeared entirely. The same is true of the lateral striæ and the longitudinal fibrillations.

There may be sometimes an overgrowth of pigment granules. These granules may be deposited in the muscular fibre itself or in the interstitial connective tissue between the fibres. The pigmentary granules may be more or less irregularly placed. Usually there are a larger number near the muscle nucleus. Occasionally the whole fibre may be larger than normal and appear almost entirely homogeneous.

Alongside of some fibres completely degenerated there are others which are relatively healthy or diseased only in parts. The connective tissue between the fibres in typical fatty degeneration of the muscle is usually not much, if at all, increased in quantity. In other cases, especially where there are fibroid changes throughout the vascular system and in different viscera, there may be a considerable increase of interstitial connective tissue and also pronounced fatty degeneration.

For further and more complete and accurate knowledge of the pathology of these cases I would direct my readers to the best modern treatises on cardiac disorders, among which that of Gibson seems to me particularly valuable. To this author I feel especially indebted for much valuable knowledge, which I have not hesitated to utilize and to whom I now give full credit.

OSSEOUS CYSTS OF THE TIBIA.[1]

BY CARL BECK, M.D.,
OF NEW YORK.

CYSTS of the long bones are of a decidedly benign character, and consequently they are accessible to conservative surgical treatment— *i. e.*, to local extirpation ; but, unfortunately, their signs resemble those of osteosarcoma so much that the temptation to treat them alike is not small. Osteosarcoma being of a most malignant character demands the most radical steps—that is to say, prompt amputation. Osseous cysts demand simple opening and emptying of the cavity.

The grave prognosis of sarcoma arms the surgeon against any feeling of sentimentality. Under such fatal circumstances he will not shrink from urgently advising one of the most mutilating operations, because he knows that otherwise not only a limb but also life will surely be lost.

On the other hand, how painful must it be for a surgeon to find that because of his error of diagnosis such radical steps have been taken unnecessarily ; that, in other words, an extremity was amputated where only an osseous cyst existed, which could have been cured by simple incision.

It is not very difficult to confound the two diseases. Osseous cysts resemble osteosarcoma in their slow and painless onset, often preceded by an injury, in the gradual bulging of the area involved, and in their preference of youthful age. These being characteristic features of osteosarcoma as well as of osseous cyst, it is evident, therefore, that the differential diagnosis cannot be made by considering the history, nor by inspection, nor by palpation.

The fact that the interior of the cyst is filled with opaque, bloody serum and that its walls are lined with a smooth coat, while in osteosarcoma solid masses are formed, indicates that an exploratory incision combined with microscopical examination would clear the question of diagnosis.

But here also, as in many other obscure ailments, the Röntgen rays have showed me their usefulness. Not only do they differentiate well, but they even give us more valuable information than the exploratory incision itself, which, therefore, should always be preceded by skiagraphic examination ; and for the patient a photographic exposure is certainly more agreeable than an exploratory operation. After a conservative operation has been decided upon the microscopical examination may well be made after the operation.

[1] Case presented to the Surgical Section of the Academy of Medicine, March 11, 1901.

At a meeting of this section (January 9, 1899) I called attention to the usefulness of the Röntgen rays in a case of femoral aneurism which on account of its extremely thick walls showed no pulsation, so that it had originally been taken for osteosarcoma, an amputation then having been considered.[1]

From a skiagraphic study of a series of osteosarcomas, to be published in detail in another article, I feel justified in saying that in osteosarcoma the outlines of the bone always appear more or less abnormal and indefinite, some areas even appearing entirely translucent; while in osseous cyst the cortex appears thin and narrow, but well marked and regular. The fluid centre of the bone is entirely translucent, the light shade showing the same regularity. The adjacent epiphyses are normal.

It is especially the regularity of the texture of the walls of the cavity as they appear on the skiagraph which seems to me to be the characteristic skiagraphic feature of osseous cyst in contradistinction to the irregular texture of osteosarcoma. I may add that the vicinity of the epiphysis is also in favor of osseous cyst for histological reasons, as will be explained below.

The following cases may serve as a practical illustration of the value of the Röntgen rays in this connection:

CASE I.—H. C., a well-nourished boy, aged ten years, emigrated from Russia several months ago and presented himself to me on November 18, 1900. His family history is good. He was always well until eleven months ago, when he fell into an excavation on the street. On account of the intense pain in the upper portion of his right tibia and the functional disability a fracture was thought of at first, but after having remained in bed for two days he was able to walk around again. Four weeks later he fell again on the street, showing the same symptoms as on the previous accident, but this time he had to stay in bed for four weeks. It was then that a swelling of the size of a large filbert was detected at the spine of the right tibia.

Three months ago he fell for the third time, then being confined to bed for six weeks. When he got up he was free from pain, but he limped and the swelling below his right knee had markedly increased. Walking had become more and more difficult.

The mother reported to me that she had sought surgical advice and that the tumor had been pronounced to be a malignant growth, which demanded immediate amputation in order to save the boy's life.

Inspection revealed a normal and freely movable knee-joint. Nearly the whole upper half of the tibia is occupied by a painless swelling which has the shape of a spindle, and is most pronounced anteriorly. It begins at the epiphyseal line, reaches its height at the upper third of the tibia, and merges gradually into the normal features of the tibia at its middle. The fibula appears to be entirely normal. The circumference of the leg at the most prominent point is 30 cm., while that of

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[1] "On the Difficulty of Differentiating between Femoral Aneurism and Osteosarcoma." International Clinics, vol. iv., ninth series.

the left leg measures 25 cm. (Fig. 1.) The surface of the tumor is smooth. Its consistency is hard; a few areas appear slightly softer. Forcible pressure reveals the presence of œdema. There is neither pulsation nor fluctuation. The skin is normal and movable. The inguinal region does not show the presence of swollen glands.

It was no more than natural, in view of these facts, to think that an osteosarcoma had to be dealt with; but before arriving at a definite conclusion I consulted the Röntgen rays, which revealed the presence of a large triangular shade, the base of which corresponded to the epiphyseal line. The triangle was surrounded by a narrow, dark, and regularly arranged shade, which represented the distended but other-

FIG. 1.

Osseous cyst of the right tibia.

wise normal cortex of the tibia. The light shade was interpreted as a cavity, presumably containing a fluid of some kind. The normal outlines of the fibula can be distinctly recognized through the light area, although the inner surface of the leg rested on the photographic plate. (Fig. 2.)

The marked regularity of the texture of the cortex, as well as the uniformity of the light shade representing the cavity, convinced me that osteosarcoma was not present in this case, wherefore I advised a conservative operation. This was performed at St. Mark's Hospital, November 21, 1900.

The anterior surface of the tumor was first exposed. After having

incised the thin bone shell with a bone-knife bloody serum escaped through the opening made. Now an elliptic portion was removed from the osseous shell in order to get access to the large cavity, which was filled with black, bloody, viscid serum. There were no coagula. The

Fig. 2.
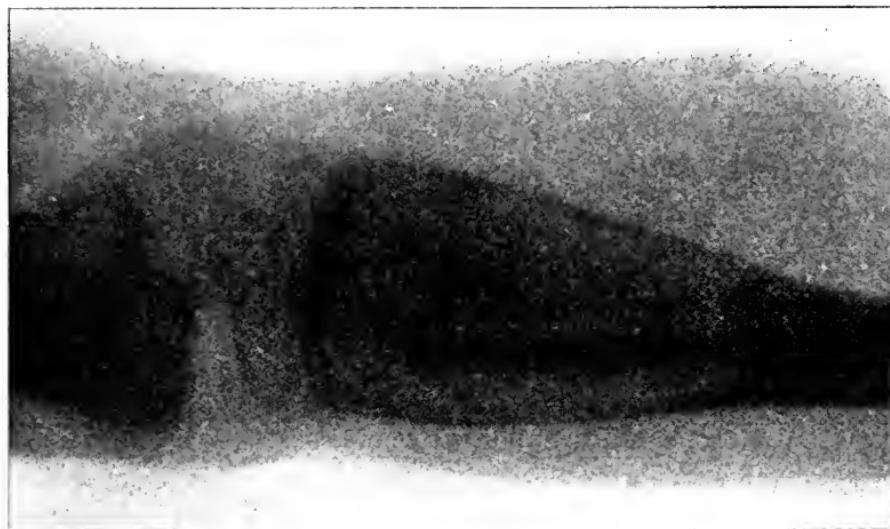
Osseous cyst of the tibia near its upper epiphysis.

osseous walls were lined with a thin membrane and the cavity was traversed by a few fibres of osseous remnants, arranged like network, but not much thicker than a thread.

After having scooped out the cavity thoroughly its osseous walls were so thin that by pressing them together forcibly—in fracturing them,

Fig. 3.

Osseous cyst of right tibia, two months after operation. The light shade at the centre of the tibia, beginning below the epiphyseal line, indicates the presence of a sinus.

in fact—their inner surfaces could be well approximated, so that no more cavity existed, so to say. Instead of packing the cavity I preferred to resort to this unusual procedure, analogous to the principles

of approximation of the chest wall in old pyothorax. Only in the lower edge of the bone wound a small iodoform wick was introduced.

There was considerable bloody oozing until five days after the operation, then the secretion became serous. Recovery was uninterrupted. Only a small sinus, discharging a few drops of serum in a day, is still present. The patient has now been up for two weeks and walks well. The repair is also well illustrated by the skiagraph (Fig. 3), which was taken two months after operation.

The microscopical examination of the exsected bone-fragment and its membrane, made by the courtesy of Dr. Henry T. Brooks, showed the presence of many round cells, especially around the bloodvessels. There was no epithelial stratum nor any evidence of bacteria.

CASE II.—E. T., a girl aged thirteen years, born in New York City, presented herself to me on April 4, 1899. Eight months ago she

Fig. 4.
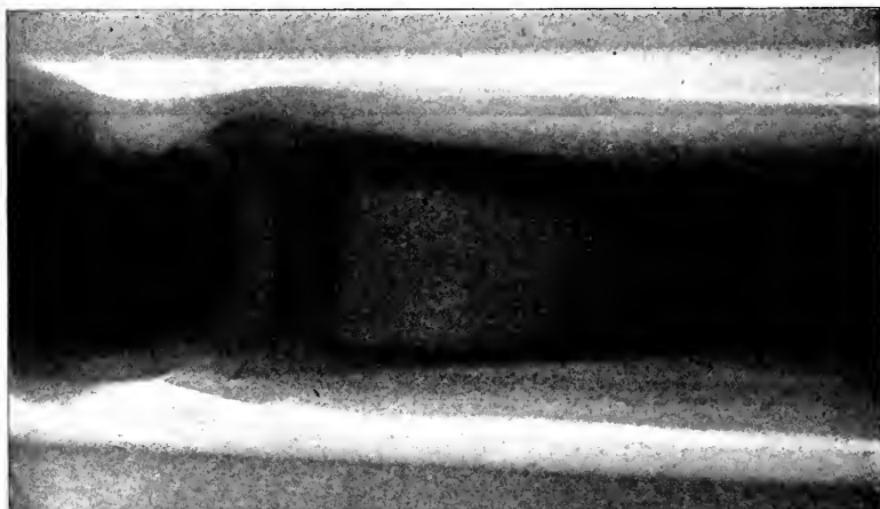
Osseous cyst of the tibia near its lower epiphysis.

slipped on a stairway and was unable to stand on her feet again. The left ankle became swollen and painful. Fomentations were applied for several weeks. No medical advice was sought until the swelling, which after four weeks' rest had become painless, increased.

The family history of the patient is good. Inspection reveals a movable ankle-joint. The lower third of the tibia is occupied by a painless tumor, which appears like exuberant callus-formation. The external malleolus is normal. The circumference of the leg at the most prominent point is 22 cm., while that of the right leg measures 18 cm. The surface of the tumor is smooth; the consistency is hard. A skiagraph taken at once revealed the same condition present in Case I., with the difference that the shade of the cortex is somewhat larger. (Fig. 4.)

The operation was the same as in Case I. The cavity contained the same black, viscid serum; the walls of the cavity, however, were thicker than those of Case I., and to their inner surface a stratum of

grayish-white tissue was attached. It had the appearance of enchondromatous masses and proved to consist of cartilaginous tissue. The microscopical examination revealed an abundance of nuclei, especially of round cells, surrounded by myxomatous and disintegrated tissue. The walls could not be approximated as well as in Case I. by forcible compression. The remainder of the cavity, therefore, was packed with iodoform gauze. Recovery was perfect after four and a half months. The patient has remained well ever since.

The etiology of osseous cysts is still *sub judice*. Virchow[1] maintains that all osseous cysts are the softened products of degeneration of such growths that were solid formerly. Such solid tumors may have originated from erratic cartilaginous fragments left from the epiphyseal line.

Schlange,[2] according to his excellent monograph, observed cartilaginous fragments in the tissues of the cyst-wall. Similar observations were made by Franz Koenig[3] and by Deetz.[4]

At the early stage osseous cysts, be they in the tibia or in the femur, are easily overlooked, the symptoms being insignificant. Sometimes there is very slight intermittent pain. The joints are freely movable and neither inspection nor palpation reveals any abnormality. After months the circumference of the extremity may appear very slightly enlarged, but the symptoms may not be fully appreciated until a fall on the thin shell of the cortex produces a fracture. Whether in our cases fracture had occurred could not be learned. Relying upon the Röntgen rays, I am inclined to believe that the previous injuries had the character of severe contusions. In view of the difficulty of differentiating between a benign cyst, accessible to conservative surgery, and osteosarcoma, demanding the most radical measures, I would advocate exposing all osseous growths to the Röntgen rays before passing a final judgment in a matter of such grave importance.

A CLINICAL AND HISTOLOGICAL STUDY OF A CASE OF CIRCUMCORNEAL HYPERTROPHY OF THE CONJUNCTIVA.

By CHARLES A. OLIVER, A.M., M.D.,
ATTENDING SURGEON TO WILLS EYE HOSPITAL ; OPHTHALMIC SURGEON TO THE
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THROUGH the kindness of Dr. J. P. Worrell, of Terre Haute, Ind., I received a small piece of tissue together with the following clinical report :

On May 5, 1894, J. A. A., a farmer, aged sixty-one years, of excellent family history and without any evidences of constitutional disease,

[1] Ueber die Bildung von Knochencysten, Monatsbericht der Berliner Akademie der Wissenschaften. Mathematisch-physikalische Klasse, 1876.

[2] Beiträge zur anatomischen und klinischen Kenntniss der Cysten in den langen Roehrenknochen, Festschrift fuer Esmarch, 1893, page 431.

[3] Langenbeck's Archives, Band lvi., Heft 3.

[4] Beiträge zur klinischen Chirurgie, Band xxvi., Heft 1.

came to Dr. Worrell with the statement that some six months previously he had noticed " a red point " between the cornea and the inner canthus of the right eye. There never had been any pain or local excitation. The functions of the eye always seemed normal. More recently the growth had encroached upon the cornea, but did not seemingly give rise to any impairment of sight.

When first seen the eyelids were healthy. The conjunctiva, other than that which was involved in the new growth, was normal except that it was crossed by large vessels that passed from the cul-de-sac toward the mass.

The tumor was sharply defined and was somewhat elevated. Its color was pinkish-white. Upon it large bloodvessels branched and terminated at a point situated at about the centre of its area. The mass had the appearance of being composed of nodules that had become flattened and almost obliterated in places by pressure. This nodulated appearance gave the margin of the growth a crenated outline. The thickness of the part of the mass which rested upon the cornea did not seem to exceed that of writing paper, it becoming increasingly thinner as it passed to the apparently undisturbed portion of the corneal membrane. The nodular portions of the growth were bluish-white in tint, while the intervening tissues appeared translucent.

No examination of the growth with the microscope was made.

Removal was accomplished by section of the conjunctival membrane just beyond the limits of the mass, with dissection of the growth from its submucous and corneal beds. While removing it, it was found that that portion of it which covered the cornea could be stripped from that membrane with but little resistance, leaving the exposed surface clean and smooth. This being done, the loosened conjunctiva was slid over the open area toward the corneal limbus and sutured into position. Union by first intention took place. Recovery was uneventful.

The patient was not seen until May 19, 1896, when he reappeared with a recurrence of the disturbance at the inner and the outer limits of the cornea. In the former position the growth was found to be the smaller, while in the latter it overlapped the corneal membrane some two millimetres. It extended out into the conjunctiva a distance of some five millimetres. Its vertical dimensions equalled five millimetres. Owing to a deposit of loosely applied epithelial débris upon its surface it was quite elevated and acuminated.

After excision of the mass the exposed area was thoroughly cauterized and overlaid with a conjunctival flap which had been brought from above. The flap united without delay. The sacrifice of conjunctiva incident to this operative procedure made so much contraction upon the outer canthus that no further loss of conjunctival membrane seemed practical.

On July 15th of the same year it became necessary to cauterize a small bud at the upper margin of the cornea.

From time to time, at intervals perhaps of two or three months, it was compulsory to cauterize small areas at different points along the edge of the cornea. This method of treatment maintained the eye in a comfortable condition, and seemed to justify the conservative plan that had been adopted.

From September, 1897, to May, 1900, the patient disappeared from observation. On his return, May 23, 1900, it was found that a marked

change had taken place. The growth had recurred upon the nasal side at a point at which it had not been seen for five years' time. It was somewhat quadrilateral in shape. Its greatest vertical diameter was about eight millimetres in length, while its horizontal diameter equalled six millimetres in width. It presented the same general appearance as that of the first growth. Upon the temporal side the mass had extended upon the cornea without any increased involvement of the conjunctiva. Along the upper conjunctival limbus it encroached upon the cornea until it almost reached the mass that was situated on the nasal side.

At this time an examination of some of the excised tissue by a competent microscopist showed that there was nothing malignant in the nature of the growth. (Nevertheless, the removal of the eyeball had been recommended by a prominent ophthalmic surgeon.)

Operative interference was again resorted to. The portion of the growth situated upon the nasal side was excised, the incision being kept in the line of the healthy part of the conjunctiva. The exposed surface was thoroughly seared with an actual cautery. Conjunctival flaps were formed, brought from above and below, and stitched into place. The removal of the mass from the other portions of the cornea was accomplished by excision of that portion of the growth which overlapped the cornea, this being followed by a deep cauterization at the limbus. During this procedure it was found that when the portion of the growth which rested upon the cornea had been removed there did not appear to be any involvement of any part of the conjunctiva except that which was immediately adjacent to the cornea and which had been destroyed in the thorough cauterization that had been made along the line of the corneal limbus.

The conjunctival flap on the nasal side readily united, while the furrows that had been produced by the cauterization procedure healed without any undue irritation.

When seen a month later it was found that the cornea exhibited an opacity at its margin similar to that which is shown by a rather broad arcus senilis.

The patient when recently studied (December, 1900) did not present any evidence of a recurrence of the condition. The eye was quiet and vision was normal.

A note from Dr. Worrell, under date of May 1, 1901, states that the patient recently died from what was said to have been an attack of acute nephritis, there never having been any recurrence of the growth.

Upon receipt of the specimen I sent it to Dr. Edward A. Shumway, of this city, requesting him to prepare it for study with the microscope. In due time he returned a number of sections, with the statement that he had embedded the piece of tissue, which measured $5 \times 4 \times 1$ millimetres, in celloidin before cutting.

Careful personal examination of the slides in association with Dr. Shumway's report showed that the involved portion of the conjunctival epithelium was greatly thickened. The deeper cells were cylindrical in form, and corresponded with the normal epithelium of the conjunctiva. Succeeding several layers of these cells there were layers of large, irregular polymorphous cells, the nuclei of which were very large, stained slightly with hæmatoxylin, and showed more darkly staining nucleoli. In addition to the appearance produced by the light staining

the majority of the nuclei evidenced signs of degeneration. They presented vacuoles of various sizes, some of which were so large as to press the nucleoli far to one side. The surface of the epithelium was represented by numerous layers of flattened cells, with shrivelled and fragmented nuclei, such as are seen in the horny strata of the epithelium of the skin. There was not any infiltration of the subconjunctival or corneal tissue with epithelial cells. Processes of connective tissue, however, extended upward into the epithelium, and carried bloodvessels. The cornea was represented at one end of the sections, and showed destruction of Bowman's membrane with decided round-cell infiltration. The subconjunctival tissue was quite vascular and was moderately infiltrated with round cells.

REMARKS. The clinical symptoms of the case were typically those that are found in circumcorneal hypertrophy of the conjunctiva, as seen in elderly subjects. There were not any gross secondary disturbances such as tessellated granulations in the conjunctiva, neither were there any of the mucoid or mucopurulent secretions that are so frequently noticed in cases of the acute localized types of the affection. The bulk of the mass was composed of the characteristic milky-white nodular depositions. Microscopically, the examination of the hyperplastic tissue about the limbus of the cornea showed a marked increase of the epithelial structures with pronounced sclerosis of the surface cells.

NITROUS OXIDE AND OXYGEN AS A SURGICAL ANÆSTHETIC.

WITH A DESCRIPTION OF A NEW APPARATUS FOR ADMINISTERING THESE GASES AND REPORT OF 100 OPERATIONS, THE NARCOSIS LASTING A HALF HOUR AND UPWARD.[1]

BY S. ORMOND GOLDAN, M.D.,
OF NEW YORK.

IN the use of nitrous oxide in combination with pure oxygen we possess an anæsthetic which must have for every operator a double interest —first, its universal safety ; second, the fact that there is absolutely no physical condition of the patient which contraindicates its use. All will admit that in the interest of the patient the safest anæsthetic should always be selected. This is rarely done at the present time, for the reason that ether and chloroform are in the vast majority of instances considered the only anæsthetics adapted for surgical purposes. In the rare instances where nitrous oxide and oxygen are selected as the anæsthetic it is as a matter of necessity, not choice ; that is, because other anæsthetics, for various reasons, are contraindicated. It might be as well to state right here that where profound and long narcosis is neces-

sary another anæsthetic should be selected; yet as our knowledge increases in the use of this drug its field for usefulness will greatly extend.

The use of a new anæsthetic or method is usually desired by those who have rarely or never used either. Nitrous oxide is so universally associated with dental work that the surgeon is prone to imagine it is not applicable to operations of longer duration; even if he thinks otherwise the old cry of complicated apparatus and great skill, both necessary and hardly obtainable in most hospitals, preclude its use. It is well known that in ordinary gas administration the production of anæsthesia is accompanied with intense cyanosis bordering on asphyxia; efforts have been made to eliminate these asphyxial symptoms by admitting air in various quantities, but in doing so anæsthesia also passed off, the patient becoming conscious.

The inhalation of nitrous oxide alone has very frequently been said to produce its effects simply by asphyxiation, but while true to a certain extent there is no doubt it has pure anæsthetic properties, and nothing demonstrates this more perfectly than its use in combination with pure oxygen gas. Here asphyxial phenomena are entirely avoided, yet if the gases are accurately proportioned perfect surgical anæsthesia can be obtained in most cases.

It is perfectly possible to administer gas alone for long operations. I have so used it; but a little thought will convince anyone that this is not an advisable thing to do, especially where we have gas and oxygen, for to anæsthetize a patient more or less cyanosis is necessary; then a breath or two of fresh air is given and the mask reapplied— that is, before consciousness is regained. This continual deprivation of oxygen, it is well known, abolishes metabolism. It may be questioned whether to keep this up for a long time would not be a more serious method than the use of ether or chloroform. Now the oxygen in the air exists to only about 20 per cent.; 80 per cent. is practically an inert gas (nitrogen), and to use this combined with nitrous oxide means, in the first place, we can never increase the gas sufficiently to obtain anæsthesia and at the same time utilize the oxygen to prevent cyanosis. The oxygen can never be regulated; this method must of necessity be one of deep anæsthesia by gas bordering on asphyxiation. In the administration of an inert gas and a small percentage of oxygen—that is, with the patient alternately anæsthetized and conscious, or nearly so —unless the administrator is particularly skilful it cannot be conducted without great discomfort to the surgeon. In short cases the method has no disadvantages; the surprise is that the dentist alone, and not the surgeon, makes use of it.

It must occur to everyone who administers gas that if a method could be devised by which the oxygen percentage could be regulated by using it pure in combination with nitrous oxide we would have an ideal anæs-

thetic. Without going into the history of the subject, it is simply necessary to remember that if the inert oxygen can be eliminated the nitrous oxide percentage can be increased just that much; then by using pure oxygen to the amount of 10 per cent. we can obtain perfect anæsthesia with no asphyxia. Does anything prove more conclusively that nitrous oxide has pure anæsthetic properties? Practically it is found that non-cyanotic anæsthesia is obtained by this combination when the oxygen varies between 8 and 15 per cent.

The late Dr. W. W. Van Arsdale, of New York, to whom I am indebted for many practical hints regarding this anæsthetic, used volumetric quantities of these gases in a large number of cases; this was about ten years ago, when this method of anæsthesia was first attracting considerable attention abroad and here. He said that these gases could not be used except in minor cases, the reason being that he could not vary his percentages of oxygen; but he lost sight of two very important practical points—that the same percentage will not answer in all cases, and, furthermore, it must be varied from time to time in the same case. To administer nitrous oxide and oxygen requires a more complicated apparatus than for ether and chloroform, and an absolute essential is the undivided attention of the administrator.

While it is possible to accurately determine the exact proportion of oxygen used in this method of anæsthesia, it is not practicable, as several cylinders would be necessary, each having a different proportion of the gases; then the cylinders would have to be freshly filled, as decomposition is said to take place (Hillischer) when these gases are kept together any length of time, rendering the mixture irrespirable, due to the higher oxides of nitrogen. This method, it can readily be seen, is impracticable. To obviate these difficulties several apparatuses have been devised to administer the gases from separate cylinders, the mixing in varying proportions taking place at the time of inhalation. All these apparatuses give the percentage of oxygen only approximately. We determine the percentage by the condition of the patient, varying, as said before, in ideal narcosis between 8 and 15 per cent., possibly at times more. One of the great features claimed for the apparatus shown is its simplicity; it represents a complete instrument for the following methods: gas alone, gas and ether, gas and oxygen, ether alone. The apparatus consisting of Fig. 1 was first devised for the administration of nitrous oxide gas alone. I then added the aseptic separable ether chamber for the gas-ether method (see *Journal of the American Medical Association*, December 15, 1900).

The gas stop-cock (Fig. 1) contains two valves. The inspiratory valve is set in an inner cylindrical tube, which works by a handle through a right-angled slit in an external cylinder supporting the expiratory valve superiorly, and inferiorly giving attachment to the gas-

bag for gas alone, or the inverted Y-shaped tube for gas and oxygen. The valves themselves are made of thin sheet hard rubber, and are
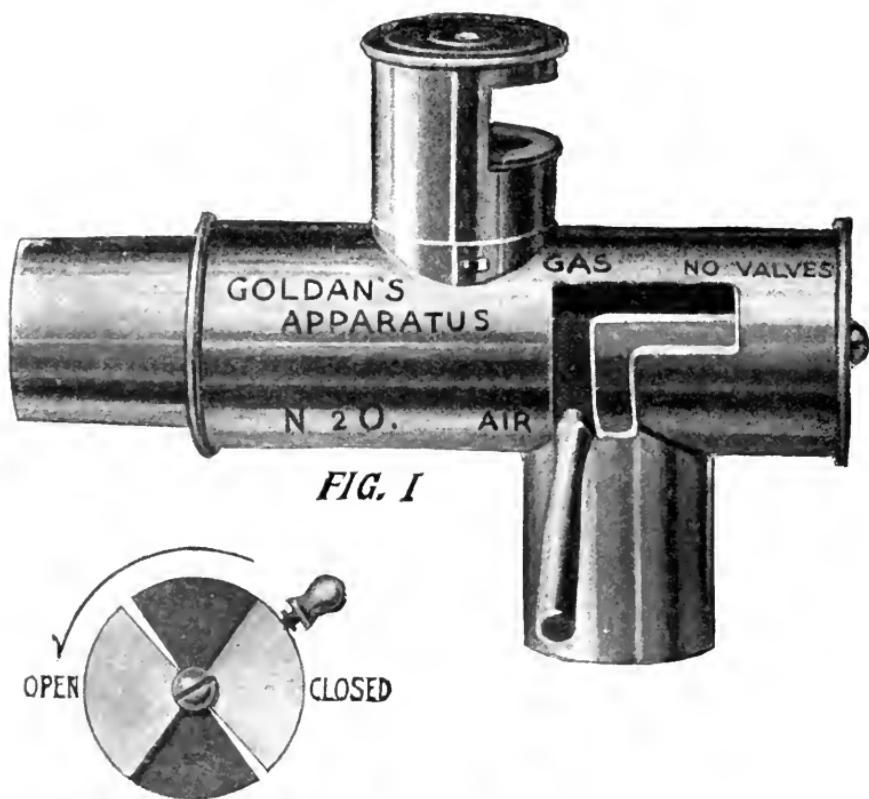
FIG. I

FIG. III
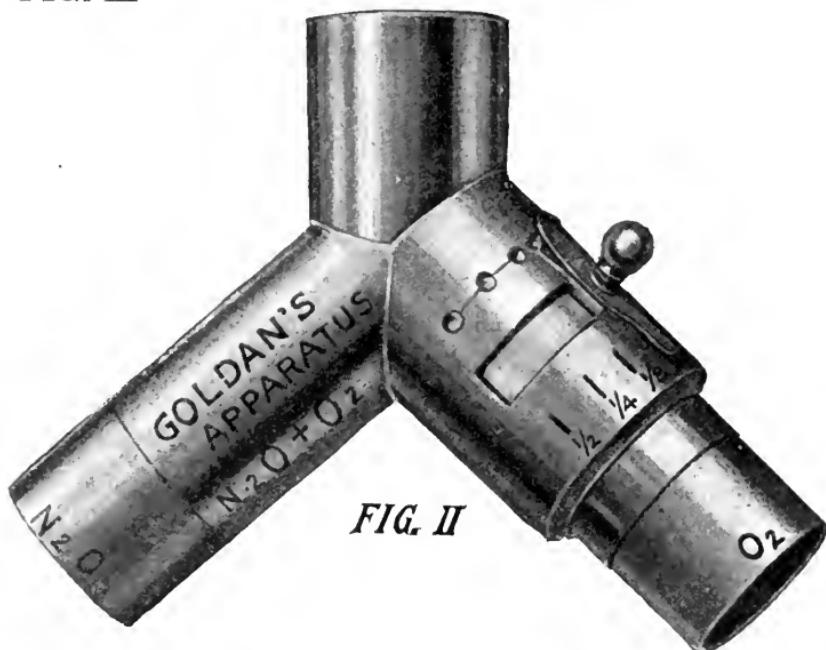
FIG. II

therefore indestructible. When the handle is turned down to the point indicated by " air " (see Fig. 1 diagrammatic plate, Fig. 4) the gas-bag is closed by means of the obturating function of the inner tube; when the handle is turned upward to the place indicated by " gas " air is ex-

FIG. 4.
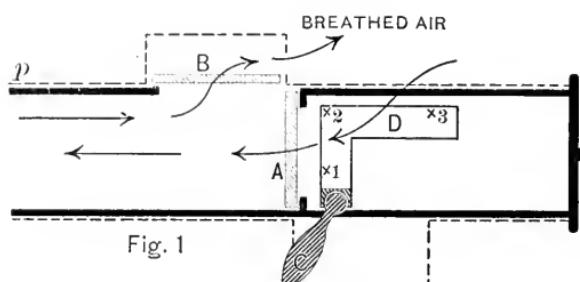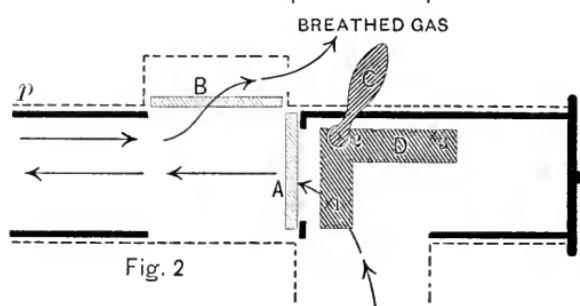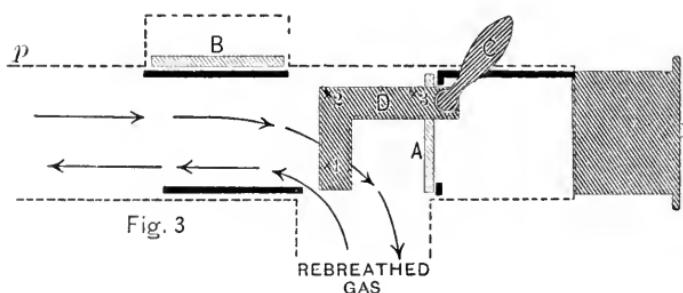
Diagrammatic representation of stop-cock.

Dotted lines indicate external part of stop-cock, heavy lines and shaded part, internal tube. Arrows indicate direction of inspiration and expiration. The valves are indicated by shaded lines. *A.* Inspiratory valve. *B.* Expiratory valve. *C.* Index handle. *D.* Right-angled slit. *P.* Proximal end of stop-cock, attaching face-piece. *X.* Handle turned down; air breathed. *X*2. Handle turned up; gas breathed. *X*3. Handle turned up and back; gas breathed back and forth into gas-bag.

cluded and gas is inhaled by means of the inspiratory valve. Expirations of the patient pass out through the expiratory valve; at the same time the inspiratory valve is closed.

When the handle is pushed backward to the place indicated by " no valves " the valves are thrown out of action; the patient then breathes

back and forth into the gas-bag. This three-way action of the stop-cock is a feature not represented in any of the dental gas inhalers of American manufacture. This feature is used only with the gas and ether method.

The essential part of the gas and oxygen apparatus is an inverted Y-shaped tube (Fig. 2) attaching to the lower part of the valved stop-cock. It will be noticed that the right arm of the tubes is somewhat longer, to accommodate a revolving obturator which regulates the quantity of oxygen. This arm of the tube is so constructed that when the obturator is fully open it represents exactly one-half that of the nitrous oxide arm; if so used it would represent exactly $33\frac{1}{3}$ per cent. of oxygen. It may be said that anæsthesia is never possible with such a large percentage of this gas. Graduations are accurately marked on the surface of the tube as $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, representing respectively about 33, 25, 12, 6, and 3 per cent. of oxygen; these graduations have always reference to the opposite tube. The surface of the oxygen tube has also small depressions into which the metal spring slips when the oxygen is turned on; this permits the use of the apparatus without taking the attention of the administrator from the patient.

Fig. 3 shows the obturator, which opens by revolving from right to left. The small opening represents about 6 per cent. of oxygen. The vertical arm of the Y is the mixing-chamber for the two gases.

Two separate gas-bags are used, and by this means their respective distention may be more easily seen than with the single bag with septum. From four to six feet of rubber tubing connect the cylinders and gas-bags for transmission of the gases. The cylinders shown are the small portable ones of English manufacture, with foot attachment. Fig. 5 represents the gas and oxygen apparatus complete. There are two cylinders for nitrous oxide and one for oxygen, for the reason that a far greater quantity of nitrous oxide is used than of oxygen. The face-pieces of different sizes may be obtained of rubber, celluloid, or metal, with inflatable rims. For the cases having beards I have had made metal aseptic mouth-pieces of different sizes; these are used when for any reason atmospheric air cannot be entirely excluded when using the mouth-tube the nostrils must of course be closed.

In order to obtain perfect results with nitrous oxide and oxygen particular attention must be given to the following points:

1. The apparatus must be in perfect working order and always tested by the administrator himself.

2. A sufficient supply of both gases at hand.

3. Atmospheric air must be rigidly excluded. In patients with beards the nostrils may be closed; the mouth-tube may be used instead of the face-piece or the beard thoroughly moistened with water.

4. The patient should be prepared as for any surgical anæsthetic.

FIG. 5.
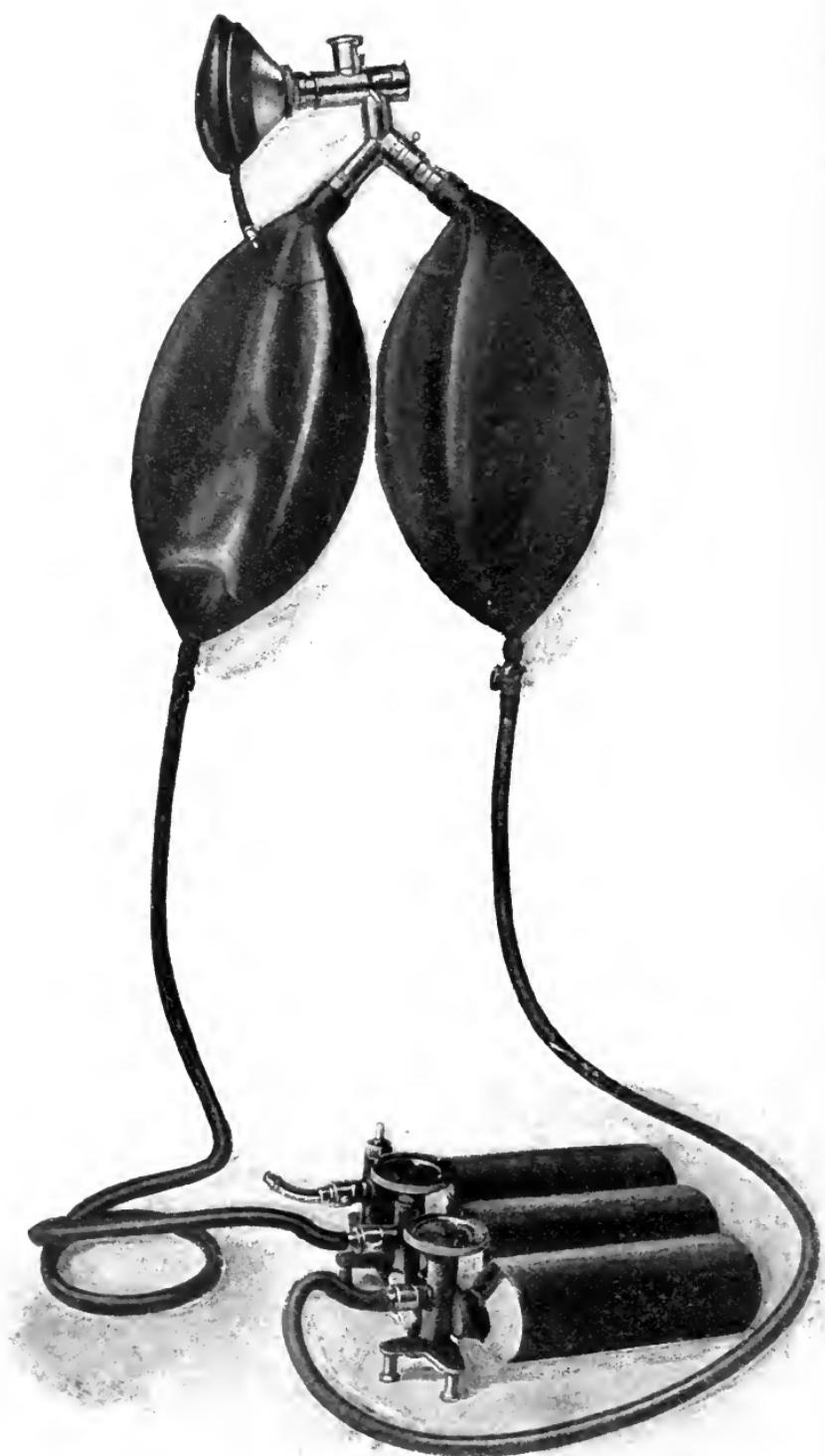
Showing the nitrous oxide and oxygen apparatus complete.

5. The gas-bags should never be fully inflated, but between one-half and two-thirds full. In this way the pressure of the gases is kept more nearly equal.

6. Oxygen should not be turned on immediately the administration begins, but sufficient nitrous oxide inhaled to replace the oxygen existing in the blood ; three to six breaths will be sufficient.

Oxygen should be admitted gradually and in quantity determined entirely by the patient's condition, remembering cyanosis calls for more oxygen ; evidences of excitement and returning consciousness meaning that less oxygen is required. In using the gases in long narcosis the taps of especially the nitrous oxide cylinders are apt to freeze, owing to the transition of the gas from the liquid to the gaseous state, the cylinders becoming covered with frost ; to avoid this a towel wrung out of boiling water should be placed about the tap, but not about the cylinder itself.

The patient should always be placed upon the operating-table in the position in which the operation is to be performed ; any position may be employed, providing it will not interfere with the anæsthesia. The preferable postures, in my experience, have been the dorsal and Sims.

Nitrous oxide and oxygen requires about double the time to produce its effect as does the gas alone, the gas alone requiring from 30 to 60 seconds ; gas and oxygen from 60 to 120 seconds. In either case consciousness is so quickly lost that I have found it generally impossible to obtain statements from patients as to their subjective symptoms. Sensations are pleasant or unpleasant, depending much upon the temperament of the patient. Hallucinations in some form are not infrequently experienced, and as this may simply take on a pleasant or unpleasant dream it is occasionally difficult to convince the patients that they have not gone through an actual experience. I particularly remember a case where the patient, a man, upon recovering consciousness after gas for a short operation, for some time could not be convinced he had not been to a prize fight. It was an amusing experience to hear his more expressive than elegant remarks regarding the affair.

When inhaling these gases the sensations are much the same as with gas alone ; anyone who has inhaled chloroform and nitrous oxide respectively must have noticed the similarity in the peculiar sweetish odor, or rather taste. The oppressive sensations of gas alone are usually absent, providing the gases are not inhaled from a long tube. I find these oppressive symptoms are more often due to the apparatus than to the gas, whether inhaled alone or in combination with oxygen ; as the inhalation proceeds there develop paræsthetic sensations in the tips of the toes and fingers and also the tongue. There is a more or less sensory anæsthesia while consciousness is still present. As the jaws

become firmly closed it is well to insert a mouth-prop before beginning
the administration, and also in oral cases when using the mouth-tube
instead of the face-mask. Insensitive conjunctivæ and a snoring respi-
ration are the best signs of anæsthesia in dental cases. This condition
of snoring should be permitted for from three to five minutes before
removing the mask. It will then be found that the available operative
period will be very appreciably longer than it is when using the gas
alone. The color at the height of a gas-oxygen narcosis is a pinkish
hue, at times slightly bluish, but never the cyanosed condition seen
when using the gas alone. The pulse and respiration are approxi-
mately normal—somewhat more rapid, if anything, and frequently far
better than they were prior to the anæsthesia. The pupils are normal
or slightly dilated, never markedly so, and the lids are closed and the
conjunctivæ insensitive. Perspiration is profuse, particularly in the
longer narcoses. Relaxation in abdominal cases is not as profound as
with ether or chloroform, and this, it may be said, is the only serious
drawback to the use of this anæsthetic in abdominal work. Conscious-
ness, even in long narcosis, is immediately regained.

It is evident that any agent which is capable of producing insensi-
bility must have more or less shock associated with it. While this is
true regarding gas and oxygen, this shock is infinitely less than with
ether or chloroform. Convalescence is never delayed with this anæs-
thetic. Nausea and vomiting occasionally occur, particularly in the
longer anæsthesias, but are rarely persistent. Headache, more or less
severe, is of not infrequent occurrence. Owing to the large quantities
of the gases used, nitrous oxide and oxygen is the most expensive method
of anæsthesia. Based upon my own experience, I should say in an opera-
tion lasting one hour there would be used from 100 to 150 gallons of
nitrous oxide and from 10 to 30 gallons of oxygen.

In the report of the 100 narcoses where nitrous oxide and oxygen was
used as the anæsthetic I have selected those lasting a half hour and
upward ; the shorter cases, covering almost the entire range of minor
surgery, as tooth extractions, abscesses, curettings, for a few minutes,
etc., I have omitted. In the cases reported the operation in most in-
stances was of shorter duration than the narcosis. When not indicated
the narcosis continued from thirty to thirty-five minutes.

1 case	double amputation of the breasts and axillæ . . .	2 hours	40 min.
1 "	single amputation of the breast and axilla . . .	2 "	0 "
1 "	nephrectomy	2 "	25 "
1 "	exploratory cœliotomy for supposed tumor of the stomach	1½ "	0 "
2 cases	appendectomy . . . (respectively) 1½ hours and	1 hour	0 "
2 "	abdominal hysterectomy " 1¼ " "	1 "	0 "
2 "	removal of tubercular lymph nodes (see details of the third		
	case where gas and oxygen were used) . . 1½ and 1¼ hours		
1 case	epicystotomy	1 hour	
1 "	cœliotomy (ovarian cyst)	1 "	
2 cases	perinephritic abscess . . . . . each	1 "	

1 case cœliotomy for abscess and removal of deep sutures . . 1 hour.
1 " removal of tumor from thigh and hemorrhoids.
6 cases vaginal hysterectomy, two of these lasting 1 hour each and one 2¼ hours.
1 case prostatic hypertrophy (Bottini).
12 cases dilatation of sphincter and removal of hemorrhoids.
1 case amputation of toes (for gangrene).
3 cases posterior colpotomy.
1 case anterior colpotomy and shortening round ligaments.
2 cases cystoscopy (the position in one of these cases was the complete Trendelenburg).
1 case excising rib.
2 cases removal of axillary glands.
1 case incising and packing mammary abscess.
13 cases uterine curettage (simple).
8 " " " (carcinoma).
5 " " " (puerperal.
1 case exploring, curetting, etc., sinus to kidney.
1 " incising, packing, etc., parotid abscess.
6 cases trachelorrhaphy.
9 " perineorrhaphy.
7 " trachelorrhaphy and perineorrhaphy combined.
2 " varicocele
1 case abdominal wall abscess (typhoid).
1 " catheterizing ureters.

This last case was anæsthetized by me for Dr. Howard Kelly, of Baltimore; the position was a most difficult one for any anæsthetic—that is, the knee-chest for the placing of catheters, then the dorsal for the taking of an X-ray photograph. The patient exhibited some muscular movements of the lower extremities, rendering this photographic feature impossible.

The details of the narcosis I had the pleasure of conducting for Dr. W. W. Keen, in the Jefferson Medical College Hospital, are as follows:

The patient was a young lady of anæmic type; pulse, respiration, and temperature normal. Anæsthesia was induced with gas and oxygen in two minutes and maintained for thirty-three minutes. Consciousness was completely regained within one minute after the anæsthetic was discontinued. The color of the patient was a healthy pink, occasionally slightly blue. The blood was at times dark, but Dr. Keen said not more so than would occur with ether or chloroform. The pulse and respiration were about normal, pupils moderately dilated, eyelids closed. At the beginning of the operation the patient apparently once felt the knife. The operation consisted of the removal of adherent tubercular lymph nodes, during which the jugular vein was torn and ligated. Altogether the narcosis was a most satisfactory one. I saw the patient about one hour afterward. She had vomited once, the pulse was the same as before the operation, and the general condition good.

CROUPOUS PNEUMONIA.

A CLINICAL STUDY OF FIVE HUNDRED CASES FROM THE RECENT RECORDS OF THE PENNSYLVANIA HOSPITAL.

BY GEORGE WILLIAM NORRIS, A.B., M.D.,
OF PHILADELPHIA.

THE following five hundred cases of croupous pneumonia occurred in a period of about four hospital years, from May, 1897, to March, 1901, inclusive. Cases of doubtful nosology and the few that died within less than twelve hours from the time of their admission were omitted. The histories were for the most part complete and satisfactory, though in some, owing to oversight or inability to communicate with the patient, arising from his physical, mental, or linguistic disability, notes of previous illnesses and habits were scant and lacking.

The number of cases of pneumonia admitted to this hospital has greatly increased within the last two years, as the following figures show :

May, 1897 to May,	1898 total .	.	.	.	.	.	.	.	.	.	.	82
" 1898 " "	1899 " .	.	.	.	.	.	.	.	.	.	.	78
" 1899 " "	1900 " .	.	.	.	.	.	.	.	.	.	.	169
" 1900 " March, 1901	" .	.	.	.	.	.	.	.	.	.	.	171
													500

This increased prevalence is quite out of proportion to the city's growth, and as the area from which the hospital draws its cases has not been augmented during this period, the assumption that the disease has been more common seems reasonable. The city records show the following death-rates from this disease: 1898, 2482; 1899, 2424; 1900, 2959.

I. MORTALITY.

1. *General Mortality.* Out of 500 cases admitted, 125, or 25 per cent., died; 7 became phthisical.

2. *Sex.*

Males attacked .	.	.	382	Mortality	.	.	. 30 per cent.
Females "	.	.	118	"	.	.	. 20 "

3. *Nationality.*

a. { United { States { Whites attacked	173 {	Males 128	Mortality 29 per cent.						
		Females 45	" 17 "						
Negroes "	59 {	Males 38	" 34 "						
		Females 21	" 15 "						
b. Italy	"	128	.	.	.	.	.	21	"
c. Russia	"	40	.	.	.	.	.	13	"
d. Ireland	"	34	.	.	.	.	.	32	"
e. Germany	"	17	.	.	.	.	.	53	"
f. Austria	"	15	.	.	.	.	.	20	"
g. England	"	14	.	.	.	.	.	21	"
h. Other countries	"	20	.	.	.	.	.	30	"
Total		500	.	.	. Average			25	"

The fact that the mortality among the Russian Jews, who are generally an ill-nourished lot and bear disease badly, is much lower than among the Irish and Germans, who are for the most part hardy, may be reasonably explained by the greater temperance of the former race in the use of alcohol, a drug which notoriously increases the death-rate of pneumonia.

4. *Intemperance.*

Out of 34 cases known to have been drunkards . . . . 23 died.
Mortality . . . . 67 per cent.

5. *Decades of Life.*

	Number attacked.	Number deaths.	Mortality.
1 to 10 years	71	10	14 per cent.
10 " 20 "	71	7	9.9 "
20 " 30 "	136	25	18 "
30 " 40 "	84	22	26 "
40 " 50 "	67	29	43 "
50 " 60 "	30	16	53 "
60 " 70 "	13	10	77 "
70 " 80 "	6	4	66 "
80 +	1	1	100 "

6. *Occupations.*

Males. a. Indoor occupations			Mortality 26	per cent.
Outdoor "			" 29	"
b. Laborers	122	Died 42	" 34	"
Teamsters	8	" 4	" 50	"
Stevedores	13	" 6	" 46	"
School children	61	" 5	" 8.2	"
Children under 3 years	11	" 1	" 9	"

Among other callings in life the cases were too diverse for classification.

The large number of fatalities among teamsters is probably due to their indulgence in alcohol.

The longshoremen, to whom this also in a measure applies, follow a calling which constantly necessitates the most strenuous physical effort, as is shown by the fact that even the most robust sooner or later develop emphysema or cardiac lesions which force them to find other occupations.

7. *Site of Lesion.*

	Number of cases.	Per cent. 500.	Mortality.
Right lower lobe	145	29 per ct.	18 per ct.
Left lower lobe	115	23 "	13 "
Both bases	60	12 "	48 "
Right apex	55	11 "	20 "
Whole right lung	45	9 "	26 "
Whole left lung	35	7 "	20 "
Left apex	20	4 "	25 "
Both apices	4	9 "	40 "
Right middle lobe	14	2 "	21 "
Undetermined	7		

The frequency of apical pneumonias according to decades:

1 to 10 years	. . . .	20 cases.
10 " 20 "	. . . .	9 "
20 " 30 "	. . . .	15 "
30 " 40 "	. . . .	8 "
40 " 50 "	. . . .	4 "
50 " 60 "	. . . .	5 "
60 " 70 "	. . . .	2 "

8. *Complications.*

Total number complicated cases	145	Deaths	67	Mortality	40	per cent..
" " uncomplicated cases	355	"	58	"	10	"

9. *Temperature.*

		No. cases.	Deaths.	Mortality.
Maximum temperature 99°	. . .	3	1	33⅓ per ct.
" " 100	. . .	8	3	37 "
" " 101	. . .	30	12	40 "
" " 102	. . .	51	14	27 "
" " 103	. . .	153	33	21 "
" " 104	. . .	144	33	22 "
" " 105	. . .	75	16	21 "
" " 106	. . .	16	5	31 "
" " 107	. . .	1	0	0 "
" " 108	. . .	1	1	100 "

The foregoing table well illustrates the fact, clinically long well known, that highly febrile cases are much less to be feared than slightly febrile ones, the former indicating a sthenic attack, and being an index of the vital force and the reactive potential of the individual infected.

II. MENSAL FREQUENCY.
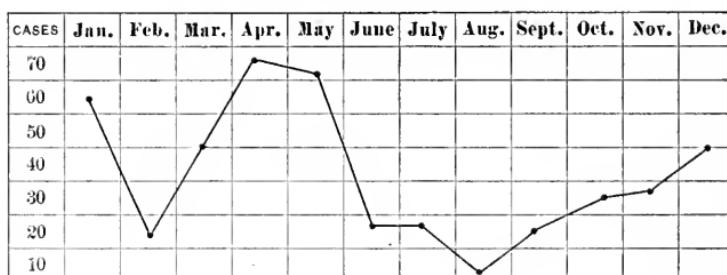
The preceding chart emphasizes the generally recognized prevalency of pneumonia in the winter, and more especially the spring months of the year. Its close correspondence to one published by Drs. Townsend and Coolidge,[1] of Boston, some years ago, serves to mutually corroborate accuracy and substantiate fact.

III. CHILL AT ONSET.

Out of 500 cases there are notes of a chill at the incipiency of the attack in exactly 250. This phenomenon was doubtless present in a considerably larger proportion than the histories would indicate.

[1] Medical News, July 27, 1889.

One case is recorded in which a chill occurred on the twenty-fourth day of an attack of typhoid fever, in which a sthenic bilateral pneumonia developed and death resulted. In another case a chill preceded the re-elevation of temperature following a pseudo-crisis, occurring on the seventh day, the disease terminating by lysis five days later.

IV. Termination by Crisis.

Three hundred and one cases ended thus; 74 cases by lysis. Days on which crisis occurred:

2d day	.	.	.	.	.	3	12th day	.	.	.	.	.	13
3d "	.	.	.	.	.	1	13th "	.	.	.	.	.	8
4th "	.	.	.	.	.	4	14th "	.	.	.	.	.	5
5th "	.	.	.	.	.	12	15th "	.	.	.	.	.	3
6th "	.	.	.	.	.	34	16th "	.	.	.	.	.	5
7th "	.	.	.	.	.	43	17th "	.	.	.	.	.	5
8th "	.	.	.	.	.	58	18th "	.	.	.	.	.	4
9th "	.	.	.	.	.	42	19th "	.	.	.	.	.	2
10th "	.	.	.	.	.	30	20th " or after	.	.	.	11		
11th "	.	.	.	.	.	18							

The latest day upon which crisis occurred in an uncomplicated case was the twenty second. In all, four cases died after crisis had taken place, in a state of practical apyrexia.

The lowest temperature noted at the time of crisis was 95.2°. It occurred in a boy of fourteen years, on the sixth day, and was followed by recovery.

The conventional tradition regarding the more frequent occurrence of defervescence by crisis upon odd than upon even days is borne out by the preceding figures in the proportion of 174 to 156.

V. Pseudo-crisis.

Pseudo-crisis was observed in 54 cases on the following days of the disease:

2d day	.	.	.	.	.	1	11th day	.	.	.	.	.	1
3d "	.	.	.	.	.	2	12th "	.	.	.	.	.	2
4th "	.	.	.	.	.	2	13th "	.	.	.	.	.	1
5th "	.	.	.	.	.	2	14th "	.	.	.	.	.	2
6th "	.	.	.	.	.	12	15th "	.	.	.	.	.	2
7th "	.	.	.	.	.	11	16th "	.	.	.	.	.	2
8th "	.	.	.	.	.	6	18th "	.	.	.	.	.	1
9th "	.	.	.	.	.	1	21st "	.	.	.	.	.	1
10th "	.	.	.	.	.	5							

Of these, two cases had two pseudo-crises; one upon the third and seventh days, the other upon the third and eighth days.

There were only five fatal cases in the above-mentioned 54. (Mortality, 9.2 per cent.)

Pseudo-crises were accredited when the temperature, after falling rapidly below 99°, reascended promptly above 102°.

VI. Previous Attacks.

One or more of these are known to have occurred in 57 cases, though the existence of the same probably were much more frequent than has been noted.

	Males.	Females.
Previous attacks within 1 year	11	1
" " 1 to 5 years	17	4
" " 5 " 10 "	10	4
" " 10 " 20 " + ...	8	1
Recovered	33	9
Mortality	29 per ct.	10 per ct.

Two had 2 previous attacks, of which one recovered.
"   "   3   "   "   "   "   "

VII. Urine.

Albumin and casts present	.	245	Albumin and casts present	.	88
Albumin alone . . .	.	78	Albumin but no casts	.	8
Casts alone	.	4	Casts but no albumin	.	2
Not recorded . . .	.	45	Not recorded . . .	.	15
Neither albumin nor casts	.	128	Neither albumin nor casts	.	12
Total number of cases	.	500	Total fatal cases .	.	125

VIII. Complications.

Disease.	Number.	Fatal.
Jaundice	18	11
Delirium tremens	17	12
Typhoid fever	15	7
Pleural effusion[1]	12	1
Phthisis	8	6
Nephritis (acute)	6	3
Empyema	6	1
Malaria	5	1
Endocarditis[2]	5	4
Pericarditis	4	3
Meningitis	4	1
Erysipelas	3	0
Gangrene of lung	3	3
Influenza	2	0
Otitis media	2	0
Rubeola	2	0
Pneumothorax	2	1
Phlegmasia alba dolens[3]	2	0
Parotitis	1	0
Peritonitis	1	1
Septic arthritis	1	1

Other diseases too scattering for tabulation : Uræmia, exophthalmic goitre, tonsillitis, insanity, volvulus, syphilis, gastritis, hepatitis, stomatitis, erythema multiforme, keratitis.

Sixty-one per cent. of the cases with icterus died.

Widely differing opinions are expressed by various authors as to the effect of jaundice upon the mortality. Mosler[4] considers it a most dan-

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[1] In the one case which died the effusion was bilateral.
[2] Four of these cases were malignant endocarditis.
[3] Reported by Da Costa, Philadelphia Medical Journal, March 10, 1898.
[4] Deutsch. Archiv. f. klin. Med., Bd. x. p. 266.

gerous complication, and found 73 per cent. fatal in 15 cases. Other authors regard this phenomenon as of but little importance. This is doubtless due to a loose employment of the term.

A slight icteroid tinge of the conjunctiva is very common and plays but a small rôle. Distinct cholemia is a very different matter. It produces great asthenia, increases the tendency to stupor and delirium, allays necessary cough, interferes with assimilation, favors tympanites, and perhaps increases the tendency of the lung lesion to spread by relaxation of the arterioles.

Schönlein has pointed out that these cases bear venesection badly, and has observed collapse following the application of wet cups; but bleeding followed by transfusion would certainly seem like rational therapeusis.

IX. The Pupils.

During the past year Sighicelli[1] and others have called attention to the state of the pupils in pneumonia. It has been stated that anisocoria is met with more or less frequently in this disease, especially in cases in which the apices are involved. Eason[2] observed mydriasis on the side of the lesion quite commonly (24 times in a series of 54 cases), and attributes this phenomenon to irritation of the inferior cervical ganglion by the inflammatory process; pointing out that flushing and pallor, due to a similar cause, have long been recognized.

With a view of investigating, I have examined the pupils in 64 cases with the following results: In 33 of these cases the upper lobe of the lung was involved, yet inequality was only found in 2 cases—in one myosis, in the other mydriasis on the affected side. The pupils were large, apparently dilated in the majority of the cases.

From the foregoing tabulation pupillary inequality would seem rare. It must be further taken into account that anisocoria is by no means an infrequent condition in healthy persons whose eyes differ in refractive power. Especially is this the case where hypermetropia and myopia coincidently exist. Plastic iritis, too, might readily be overlooked. Mere observation of the pupils, therefore, without in each case a careful ocular examination, loses much of its value, although a unilateral mydriasis which disappeared as resolution progressed would point strongly toward the pneumonia as etiological.

X. Abnormalities.

Onset.

Onset, with acute delirium	1 case.
(A stoker jumped overboard into the Delaware River in mid-winter; was brought to hospital with temp. 94° and signs of pneumonia; recovery.)	
Onset with epistaxis	1 "
" " pain in the ear of affected side	2 cases.
" " severe abdominal pain simulating appendicitis	2 "

[1] Gazz. Med. Lomby., February, 1900.   [2] Scott. Med. and Surg. Journ., April, 1900.

Infection of second lung, following recovery of first, after twenty days .   . **1 case.**
Infection of same lung two days after crisis of a seven-day attack, in a child **1** "
Abscess of nasal septum ; pus was not examined for pneumococci .   .   . **1** "

Osler[1] says he has never seen an instance of undoubted relapse, and it may be urged against the first of the above cases that a second infection—not a relapse—had taken place. But in the second case this seems to say the least unlikely, occurring, as it did, before resolution had thoroughly taken place and so closely following the primary infection.

XI. TREATMENT.

The treatment has been expectant and symptomatic. Venesection in sthenic cases to overcome cyanosis or marked dyspnœa has proved of great benefit. Wet or dry cups and the ice bag have been found useful for the relief of pleuritic pain. A mercurial laxative at the onset and the free use of opium to allay erythism, pain, excessive cough, and to procure sleep, have been seldom omitted. Ammonium carbonate has been employed when bronchitis has been marked and the sputum very tenacious. Hyperpyrexia was occasionally combatted by sponging; more usually left untreated. When stimulation was indicated, strychnine, whiskey, spirits of ammonia, nitroglycerin, camphorated oil, caffeine, or digitalis were ordered. Oxygen inhalations were apparently the means of tiding a number of cases over the critical period. Transfusion in connection with bleeding was occasionally resorted to in cases where toxæmia was great.

While it has repeatedly been shown that a satisfactory number of acute pneumonias in healthy people of not too advanced age will recover without any treatment whatever, yet it is equally certain that much can be done to alleviate suffering, which, as much as healing itself, is the duty of the physician.

If we have thus far failed in our quest of a specific treatment, if we have not succeeded in diminishing the frequency of the disease, if we have been unable to reduce the fatalities below the number that confronted our forefathers, we have at least learned a few things which we ought not to do, and we still have before us the future, promise-laden, with the vast and as yet but little explored fields of prophylaxis and serum-therapy within its boundaries.

[1] Osler. Practice of Medicine.

HEART AND CIRCULATION IN THE FEEBLE-MINDED.[1]

A CLINICAL AND STATISTICAL STUDY.

By John Madison Taylor, A.M., M.D.,

AND

F. Savary Pearce, M.D.,
OF PHILADELPHIA.

The writers desire to present in this contribution the results of observations made at the Pennsylvania School for Feeble-minded Children at Elwyn, Pa. Studies were begun also at the schools at Vineland and at Haddonfield, New Jersey, but only the data from the first institution are embodied in this paper. They will be completed as opportunity shall permit, the research occupying so much time to complete that this is only a partial presentation of their work. It is not feasible to carry out parallel investigations as to the collateral factors—blood, peculiarities of innervation, secretions, etc.—necessary to a full understanding of these complicated states until the equipment of the schools shall afford larger opportunities for thoroughness.

Of literature on the subject there is little to be found.

The attention of one of us was directed some years ago to several cases of imbecility wherein the cardiac and circulatory disabilities were pronounced and seemed to bear causal relationship to the mental impairment. In some of these treatment of the defects was followed by marked improvement, and even now we have six cases under continued observation. It would be an obvious inference that if attention were given to the vascular defects in the earlier years of life this improvement would have been greater. A further plain generalization is that those cases of backward mentality, the product of developmental interference, could be mitigated by securing more nearly normal cerebral circulation and the maintenance of a blood-supply adequately freed from ptomaïnes and other intoxications. The lowered vitality of many of these individuals is shown in primary faults of development in many parts of the central nervous system followed by gastro-intestinal and other organic disorders, and as a sequel to these the blood and the other tissues suffer. This is most conspicuous in the lower types of so-called idiots. This subject has received very moderate attention. We have done a little in that direction. We are at this time especially attracted by those of the so-called imbecile class or backward-minded individuals in whom a fair degree of amelioration can be expected, and we hope yet to secure some practical results by treatment directed toward the

vascular system and its innervation. For the idiot little can be expected from any treatment other than educational and hygienic.

The nervous system of the young child suffers from the effects of toxins in many ways not yet understood. It is possible that the foundation of much disease, especially that affecting the brain, is laid long before we are capable of suspecting or detecting its presence, and through the agency of insidious and unknown toxic agents. It is also a fair inference that much of this damage is expended in large measure upon the structures of the circulatory apparatus, through and by which the organs of elaboration and elimination are maintained in a condition of vigor and integrity. If we could control the activity of the vasomotor system alone much could be accomplished. Acute delirium, maniacal states, the rapidly developed melancholias—in short, the alternation of exalted or depressed states—may be taken as an expression of a cytolysis of the cerebral neurones. Again, it is reasonable to infer that the peculiarities of the mental phenomena depend in some measure upon the degree of cell-alteration as well as upon the character of the circulatory poison, also upon the number, condition, and situation of the neurones involved in the process.

Acute poisoning from the gastro-intestinal tract is known to precipitate infantile convulsions. If continued and repeated this may develop into epilepsy, and the irritated cortical neurones thus suffer more or less permanent damage. A mild form of toxæmia may produce vertigo and other pronounced but evanescent discomforts or disabilities.[1] Again, the autotoxæmias due to the suppression or disturbance of the functions of an organ, as seen in myxœdema, cachexia strumipriva, and those states due to the overproduction of the normal and the evolution of abnormal products of the organism, as in the condition wherein hydrogen sulphide is retained in the blood, exophthalmic goitre, acetonuria, etc., all can be said to bear close relationship to circulatory incompetence. So, indeed, but to a less conspicuous degree, as in the other two subdivisions of Albu, auto-intoxicants occur from anomalies in the general metabolism without localization, as in gout and oxaluria, and those due to the retention of the physiological products of metabolism, such as uræmia and the effects of imperfect oxidation, etc.

In a study made by Dr. Charles A. Oliver and Dr. A. W. Wilmarth, in 1891, it was shown that among the Mongolian forms of idiocy the general pathological condition bore close causal relation to imperfect development of the entire vascular system, with consequent disease of the structures all tending toward early fatalities. These individuals had club-shaped, cold, clammy extremities, necessitating extra clothing and exceptionally heated apartments. On them mere scratches became

ulcerous, and these ulcers failed to heal until warm weather returned. Ecchymoses were frequent and prevalent during any form of sickness, and they generally succumbed during the colder months of the year, with gross hemorrhagic or exudative lesions in the mucous tracts and other vital areas.   The common etiological factor was great activity and a final overthrow of the nutritive centres during the earlier portion of the antenatal existence.

The subsequent part of this study consists of tabulated records of the 72 cases studied in the total number of 955 inmates examined : Males, 40 ; females, 32.

All cases were considered and only those recorded in whom there was any suspicion of lesion.

The cases were taken from among the higher-grade children chiefly, since it is in these we may hope to find transition epiphenomena of cardiovascular sort worthy of place in practical interpretaton, and for whatever of help may come toward evolution through mechanical and chemical agents.

The percentage of boys admitted to the institution is about three to one compared with girls, probably on account of the fact that girls can be better shielded at home.   Boys are 60 per cent. and girls are 40 per cent. of the total number.   Boys are, as a rule, brighter mentally and stronger physically.

As detailed in our " Preliminary Report of the Heart and Circula-tion in the Feeble-minded,"[1] the writers have pretty conclusively in the present work arrived at a confirmation of the hypotheses recorded in that paper, and feel more than ever impressed with the great impor-tance of the subject under consideration.   From tabulation of the examination of the 72 cases carefully studied we find the following :

MALES.   Average age of the males (eight to twenty-two years) twelve years.   Of these 14 were of low grade ; 14 of middle grade, and 12 of high-grade imbeciles.

Heart.   We found no notable transposition of this or other organs in the number.   In 20 cases the heart was somewhat hypertrophied, in 1 greatly so ; this is an athletic, medium-grade imbecile.   In 2 the heart was undersized.   In 4 cases the heart was lower by one rib than its natural position (without hypertrophy).   The cardiac pulsation was feeble in 25 cases.   An hypertrophied heart in the feeble-minded does not as a rule present the increased pulse tension found in those of normal intellection.

Bradycardia (50 beats per minute or lower) existed in 3 cases ; in these there was no other discoverable lesion, so that we conclude it to be perhaps an expression of central vagi irritation.   The cardiac im-

pulse was very feeble in 12 cases, and the impulse in addition very diffuse in 10 cases; all this without gross evidence of lesion in the cardiovascular system. Thus there would seem to be a disproportionate correlation between the detectable organic lesions in the feeble-minded and the signs presenting; in other words, the central neuronic degeneration through deficient innervation may disturb circulation as does the organic disorder *per se* of the circulatory apparatus. . At the same time the contention is made that organic diseases of the heart and bloodvessels do occur much more frequently among these defectives than in people of normal brain development. Thus careful observation and treatment of the defect will undoubtedly assist both physical and mental development of the imbecile. Irregularity of the pulse was noted in 5 instances among males where cardiac lesions coexisted.

Murmurs. There was no murmur among the males that obeyed the law of the so-called functional murmurs. Of organic murmurs there were six presystolic mitral and ten systolic mitral murmurs. There was one aortic systolic murmur and one double mitral murmur. Seventy-five per cent. of the heart sounds were the so-called valvular sounds, the muscular element being feeble or ataxic. The second aortic accentuation was not quite so frequent as mitral valvular sounds—as though the relation of the co-ordination of lungs and heart was proportionately more at fault than between the heart and systemic circulation. In one case the second sound could be detected only at the pulmonary cartilage, and in most cases this element of the second sound was also markedly accentuated. .

Other special characteristics of heart-beat worthy of note were instances of marked arrhythmia in only three cases. Reduplication of the second sound was heard twice at the pulmonary area. In one case there was a patulous foramen ovale found subsequently at autopsy without physical signs to account for it during life.

Dr. Ales Hrdlika, in the *Twenty-fourth Annual Report of the Middletown, N. Y., State Hospital for the Insane*, gives the following figures as to heart disease in the insane:

Examined 1000 patients; found:

	Males.	Females.
Organic heart disease . .	10.6 per cent.	11.6 per cent.
Functional derangement .	15.4 "	8.0 "

Of which there were noted:

			Males.	Females.
Simple hypertrophy	.	.	5.0 per cent.	4.2 per cent.
" dilatation .	.	.	1.0 "	1.8 "
Mitral insufficiency	.	.	2.4 "	4.2 "
Aortic "	.	.	2.0 "	0.6 "
Tricuspid " .	.	.	0.2 "	0.8 "
Heart very excitable	.	.	6.4 "	4.4 "
" " feeble .	.	.	7.2 "	2.8 "
" " irregular	.	.	1.8 "	0.8 "

Thrills. A thrill was felt at the apex but twice, but, as noted in six instances, there were presystolic murmurs, as though the muscular force of the cardiac action was greatly weakened, which we contend is a constant phenomenon, just as the general musculature is enfeebled in these defectives. Exception to this is in those rarer instances of moral perversion whose relatively greater physical strength accompanying a smaller than normal brain capacity (thus without proper inhibition) obtains as a potent cause for aggravating the psychological imbalance already existing. Indeed, were bodily vigor *less* in these cases we might hope for diminished moral perversion.

Pulse and Circulation. Irregularity of the radial pulse was found in seven instances (17 per cent.), which is evidence that there is greater ataxia of the vascular system than in the heart itself. Studies of the effects of such drugs as digitalis as favorably affecting these cases in the feeble-minded are important, just as more careful observations of cardiac conditions in general practice yield better results in treatment. That peculiarities of the sympathetic innervation will become a fruitful field of research among the imbecile and the insane we feel certain.

The pulse-rate was over 100 in sixteen cases (40 per cent.). This cannot be certainly reported, since the exciting conditions of an examination may increase the rate of the heart beats. In thirty-five of these cases there was the clammy skin and cold, bluish extremities which warrants the conclusion that the neurovascular system was much out of proper equilibrium. In the central nervous system of imbeciles the cerebro-spinal and vasomotor nervous mechanisms lack development and balance. The pulse tension seemed increased in but two instances, excepting in two others where the left carotid pulse was comparatively stronger, and the right radial pulse was comparatively increased in tension as compared with the pulse of the opposite side.

In one case of an epileptic adult male imbecile Addison's disease was pretty positively present. It may have been only an expression of tuberculosis of the suprarenal bodies boding a more general tubercular infection, which is the cause of death so frequently at the antipodes of the race (of the imbecile and insane and of the physically weak of a high order of intellection). The *reflexes* were generally increased in the males.

FEMALES. The average age of the thirty-two females studied was twelve years. Of these eight were low grade, fifteen medium grade, and nine were high grade imbeciles. There was no instance of transposition of the heart or other organs among them. The heart was distinctly hypertrophied in six instances, was displaced down one rib in two instances, very evidently dilated in one instance, and was undersized, as shown by percussion, in three cases. In twenty-six cases the cardiac impulse was feeble, and in one instance the " impact " on in-

spection and palpation was very diffuse.   In this instance there was a very perceptible thrill, although a murmur could not be heard.   It is the opinion of one of us that the thrill which can be felt readily with the palpating hand and yet not accompanied by audible sign (a murmur) is indicative of enfeebled myocardium rather than a vibration due to hæmatic or to valvular disease, so that in the imbecile of low type tissues generally we may expect more constantly to elicit this valuable diagnostic sign (the thrill) than in organic heart disease in individuals otherwise normal.

Murmurs.   There were no functional murmurs heard among the females. This dearth of so-called functional murmurs in subjects otherwise giving audible signs of cardiac disease upholds the views of Jacobi that fewer and fewer murmurs can (if any at all) be designated as functional.

Of organic murmurs the presystolic mitral without thrill predominates.   There were five such (16 per cent.) in the cases examined. There was one aortic systolic murmur accompanied by a thrill in a subject of fairly good physique and cardiac action. In two instances there was mitral regurgitation.   In such cases compensation is better maintained than is true of other instances of valvular disease.

It is a singular fact that œdema is not often encountered among imbeciles with even marked evidences of cardiovascular disorder. Studies of the blood component by the physiological chemists may yet be fruitful in explanations of this, and may also throw some light upon feeding and on excretion of metabolites—a subject which appears to the writers important in the line of preventive and, indeed, in curative medication.

Irregularity of pulse-beat out of harmony with heart rhythm was again demonstrated as among the males, as stated under the proper heading.   It occurred in 15 of the 32 cases (50 per cent.).   Bradycardia existed in but three instances, and again where no demonstrable valve lesion was present. In over half (twenty) of the cases the radial pulses were rhythmic, but the alternating force of the pulse-beat was a notable sign of the prevailing status of vasomotor ataxia.   Twenty-one cases were subject to rapid, feeble heart action—*i. e.*, over 110 per minute. In twenty-five the surfaces of the extremities were cold, bluish, or clammy.

The females seemed of lower tone physically than were the males examined.

The figures of Dr. Hrdlika in the report previously referred to show '' out of five female imbeciles no one presents a cardiac derangement ; out of fourteen males with the same trouble we find 21.5 per cent. of organic and 7 per cent. of functional troubles.''

This author had only nineteen cases at his command to study, and yet the proportion of imbeciles in the males studied presented organic

heart trouble in 21.5 per cent. and functional disturbances in 7 per cent.

CONCLUSIONS. In a detailed study of the circulation of seventy-two cases of feeble-minded children at the Elwyn School the writers have found a great number of varied cardiovascular signs, and these out of proportion to the mental defect—so much so as to warrant assuming organic vascular heart disease to be a large etiological factor in continuing the downward course of imbeciles. The plea is urged for careful anthropometric studies and for observations in detail of somatic disease other than that of the nervous system in cases of mental enfeeblement. They are also impressed in this study by the fact that many of the high-grade cases can be bettered much more by attention being paid to therapeusis of the cardiovascular disorders of imbeciles, also of the insane. The scientific laboratory studies of the blood and excretions will also in the future furnish valuable data, no doubt, in this direction, admitting the large rôle which biochemical products must play in the pathology of many diseases.

The action of certain alkaloids upon the peripheral circulation needs careful study and experiment.

The proper use of especially directed regulated movements (and imbeciles are notably good and willing imitators) will greatly help these afflicted beings. In uplifting the physique to however slight a degree the mentality will be improved.

We would urge also that overexercise of backward children is to be strenuously avoided as a part of their training. The impression should be made upon the teachers to withhold physical overwork, in view of their preponderating lowered physique and especially of their liability to cardiac disease, as demonstrated in this contribution. We do not wish to interfere at all with the good hygiene of fresh air and proper direction of active employments.

It can be safely affirmed that America leads in the practical application of these scientific truths which are gradually being formulated for the proper care of the dependent classes.

REVIEWS.

MANUAL OF THE DISEASES OF CHILDREN. By J. MADISON TAYLOR, A.M.,
M.D., Professor of Diseases of Children in the Philadelphia Polyclinic;
Assistant Physician to the Children's Hospital and to the Orthopedic
Hospital; Neurologist to the Howard Hospital, etc.; and WILLIAM H.
WELLS, M.D., Adjunct Professor of Obstetrics and Diseases of Infancy in
the Philadelphia Polyclinic; Instructor in Obstetrics in the Jefferson
Medical College of Philadelphia, etc. Philadelphia: P. Blakiston's Son
& Co.

ALL books from the stand-point of the reviewer may be divided into
two classes: First, those of such excellence that to write of them is
only a pleasure; and, second, those which compel a careful reading
in order that something may be found worthy of praise. After a
perusal of the present volume the reviewer felt very thankful to the
fates which chose him the task, as the book is a most saisfactory
volume in every way. It is published not as a treatise, but as a working
manual, and in its 860 pages it covers the ground in a very thorough
manner. It not only is the work of the two men whose names appear
on the title-page, but others have contributed special articles along the
lines of their particular work. Among these may be mentioned par-
ticularly the chapters on the Conditions Requiring Surgical Procedures,
by William J. Taylor; the chapter by Charles N. Davis, on Skin Dis-
eases, and that on Diseases of the Ear, by George C. Stout.

Of particular interest is the portion of the work devoted to the
anatomy of childhood and the methods of examining young children.
The diseases occurring at or near birth are classed together, and this
arrangement is very satisfactory as a working method. It may be
remarked, however, that the passage of meconium does not always
signify ante-partum asphyxia.

In speaking of the treatment of asphyxia neonatorum it would have
been better to have classified the various measures with reference to their
relative importance, and by so doing to have placed the use of catheter-
ization of the larynx toward the bottom of the list. It seems rather
questionable whether it was worth while to include the method of Syl-
vester at all, as experience seems to show that it is of very little use
in this condition on account of the weakness of the pectoral muscles.
In any event, it seems unfortunate that the method by mouth-to-mouth
insufflation should be given the subordinate position in the list, as all
who have used it to any extent will agree that if not the most effica-
cious it is certainly not far from it.

It is unfortunate that in the consideration of melæna space was not
devoted to a more complete description, and particularly that no men-
tion of any possible septic cause was included in the etiology. Investi-

gations made for some time past seem to point to an infectious cause in the majority of cases.

The chapter on the General Hygiene of Infants and Children is of marked value, but from three to four weeks after birth seems rather early to take the baby out for an airing, at all events without making the reservation that it be carried in the arms and not placed in a coach. One of the most interesting chapters in the whole book is that on Feeding. It is original in that it gives not only methods for estimation of the various ingredients, but—and here it is rather unique—instructions as to the care of the cow, kind of cow best suited for infant feeding, and an account of the various proprietary foods and their use.

The chapter on Nervous Diseases gives needed space to the consideration of idiocy and imbecility occurring in children.

A paragraph which should be read by all those who meet with acute febrile diseases is that on the care of the hair in these conditions. The sacrifice of the hair is here decried as useless, and instructions are given whereby much mortification on the patient's part may be avoided.

In a word, the book reflects credit on the authors, and will make a valuable addition to the library of all who have to do with the care of children.   W. R. N.

A CLINICAL TREATISE ON FRACTURES. By WILLIAM BARTON HOPKINS, M.D., Surgeon to the Pennsylvania Hospital and to the Orthopædic Hospital and Infirmary for Nervous Diseases. Octavo. Philadelphia: J. B. Lippincott Co., 1900.

THE author of this treatise is a most ingenious surgeon who has devoted much time and thought to the surgery of the osseous system. He is connected with a hospital which probably cares for more fractures than any other institution in this country. With these facts in mind we open the book with a keen interest and are immediately struck with the magnificent scale on which it is contextured—thick leaved, remarkably clear in typography, and illumined by a series of the best skiagrams we have ever seen, illustrating almost every known fracture. A study of these pictures alone would give one a liberal education in broken bones.

The writer makes no effort to include and discuss all known or even all recognizable methods of dealing with these injuries; but, with a few exceptions, gives in great detail " that form of treatment which in his own experience has proved most simple and effective." He aims to be practical, and hits the mark by utilizing his clinical lectures for a scaffolding on which to rear his work. He pays especial attention to those details, such as padding, bathing, bandaging, passive motion, the scoring of the edge of adhesive plaster, etc., which will be prized by the tyro and which not only add to the comfort of the patient, but materially influence the resulting contour and function of the injured part.

To estimate the force necessary to break bone, Hopkins experimented on an adult skeleton with a testing machine. The femur, tibia, and fibula sustained a transverse strain of 1155 pounds before breaking; the femur, a crushing strain of 3130 pounds; the tibia and fibula, 2270 pounds, and the humerus, 2530 pounds. The figures are accurate, but

lose much of their value because one skeleton only was subjected to the test, and because the gradual pressure of the machine is not akin to the forces usually producing fractures.

The popular theory that Colles' fracture is caused by a cross-breaking strain is doubted by Hopkins, who believes direct impact communicated through the carpus to be responsible in most cases. The injury is treated by a hybrid between the Bond and the Treves splints, the former being so padded as to well fill out the natural arch of the forearm bones. We add our testimony to the value of this procedure.

He maintains that in dislocation of the head of the humerus complicated with fracture of its neck the head of the bone should be ignored or removed, and that incision with reduction is inadvisable. He uses the internal right-angle splint for all fractures of the forearm, paying little attention to muscular action in causing displacement—a factor on which much stress is usually laid. He advocates the fracture box for fractures of the leg, employing a plaster-of-Paris cast as soon as the swelling subsides, the cast extending above the knee-joint except in fractures of the malleoli without deformity. He considers the ambulatory treatment of fractures unsuited for general use. He treats most fractures of the patella by applying to the thigh a wickerwork of adhesive plaster, to which an extension apparatus is attached and which relaxes all tissue tension on the upper fragment. He believes operation to be rarely indicated.

This treatise on fractures will be of great value to the general practitioner, who has not had the opportunity to master by actual experience the details of treatment, and to the surgeon who wants to know, and thereby profit, what others think and do.   F. T. S.

THE PREVENTION OF VALVULAR DISEASE OF THE HEART. A proposal to check rheumatic endocarditis in its early stage and thus prevent the development of permanent organic disease of the valves. By RICHARD CATON, M.D., F.R.C.P. London: C. J. Clay & Sons, 1900.

EVER since the knowledge of the true nature of valvular disease of the heart was established by the French pathologists, it has been recognized that chronic valvulitis is an incurable affection as far as the valvular defect itself is concerned, and as long ago as the beginning of the century Corvisart, in his work on *Diseases of the Heart*, expressed the hope that means might be found for preventing development of valvular disease. To some extent this hope has been fulfilled, for, as the causes of acute endocarditis and thus secondarily of chronic valvular disease have become known, greater care has been taken to prevent strains upon the heart during times of operation of such causes. There is little doubt but that the number of cases of chronic valvular disease following such conditions may be lessened or the severity of the valvular defect reduced. Naturally it is a difficult matter to prove that the institution of hygienic measures or certain forms of treatment has prevented the occurrence of a disease. It would be possible to assert a desirable action if these measures wholly prevented the occurrence of the malady or if a marked reduction in frequency could be found.

Careful clinicians have for many years been accustomed to auscult and otherwise examine the heart with particular care at frequent intervals in the course of rheumatic disease of any sort and no matter how trivial in appearance. In this way alone may the beginnings of valvular disease be recognized and suitably rigorous treatment instituted to lessen as far as may be the strain upon the heart and thus diminish the frequency of permanent defects or the seriousness of such.

What Dr. Caton proposes in the little book before us is practically a continuation of this plan with some slight additions. His treatment consists of three parts. (1) The rigid enforcement of rest in cases of rheumatic disease with beginning endocardial trouble; (2) a stimulation of the trophic centres through the repeated application of small blisters over the præcordia; and (3) the use of absorbent drugs, of which he prefers sodium iodide. The first and the last of these measures have been in constant use by clinicians, and the second has been employed by many clinicians in a less systematic way than by him and without any definite notions as to the *modus operandi*. Clinicians have always felt that the use of blisters over the skin exercises an important regulative effect upon the underlying organs and a curative influence in the case of disease. While they have been unable to justify by physiological or other demonstration the faith that was in them, observation has none the less thoroughly established the justness of their view, and if Dr. Caton's remarks regarding the reflex trophic effect of blisters solves the problem it will be but the substantiation of what has come to be a matter of common belief. The author reports in the book eighty-six cases observed in hospital practice during a number of years with his observations regarding the outcome. The clinical histories given are too brief to justify the reader of the book in forming any conclusion. The existence of a beginning endocardial trouble is based in practically all cases, as far as the notes before us are concerned, upon the presence of a murmur. This, as physicians are aware, is inadequate to the purpose. Many of the murmurs in rheumatism are transient and accidental in character, and would disappear of themselves when the disease had subsided. Some, no doubt, were the murmurs caused by beginning valvular disease, and these may have been caused to disappear through the action of the curative measures adopted by the author. Of these, we confess, rest seems to us the potent one. The blisters may be as useful as the author suspects, or they may have only incidental value in giving the physician an excuse for insisting upon prolonged rest. Valvular inflammation, for it is a true inflammation of the valves, does not differ essentially from inflammation elsewhere, and with suitable rest inflammations in all parts of the body tend of themselves to subside. It is difficult for the physician himself to realize the need of prolonged rest in a case in which the local signs of valvular disease are as trivial as they often appear and still more difficult to bring the patient to realize the importance of following directions to the same end. Dr. Caton's book, however, if it does not present a method which will invariably prevent the occurrence of valvular disease, will have served a useful purpose if it leads to a more general insistence upon the part of physicians on strict hygienic measures throughout a long period of time after the apparent subsidence of rheumatic disease, even though the indications of valvular disease are obscure or uncertain. A. S.

A Treatise on Diseases of the Nose and Throat. By Ernest
L. Shurly, M.D. Illustrated. Octavo, 744 pages. New York: D.
Appleton & Co.

In this volume Dr. Shurley has given the profession a text-book on
the nose and throat that should be appreciated alike by the general
practitioner and the specialist, though to the former it will prove of
the most value, as, indeed, the author intends it should. In glancing
over the book one notes that the arrangement is according to the gen-
eral nature of the disease treated, not following the anatomical classi-
fication, as is most usually done.

He states that his aim has been to view the subject upon the side of
practical experience and observation rather than to enlarge upon and
argue upon different theories, and in this he has succeeded well. The
book is as it claims to be eminently practical; the symptoms are
classified, the diagnosis taken up and well worked out, and the details
of treatment given in such a way as to leave no doubt as to the mean-
ing. Although he naturally emphasizes the line of treatment he prefers
in a given case, he explains his reason for so doing, and also gives
other methods that have proved useful in other hands. His acquaint-
ance with medical literature is thorough and comprehensive, as shown
by the authors quoted and examples cited. Indeed, it may almost be
said that there is a little too much of this, as in several instances where
pages are quoted entire, and, although, of course, due credit is given,
it detracts in a measure from the originality of the work. This is par-
ticularly noticeable in the chapters on Diphtheria and Tuberculosis,
which are otherwise admirably treated.

Considerable attention is paid to the pathology of these two diseases,
and long discussions entered into as to the microbic origin, and, although
nothing new is brought out, the subject is laid before the reader with
the pros and cons in a very plain and attractive form. In the treat-
ment of the latter disease, more especially tuberculosis of the larynx,
Dr. Shurley believes that the indications call for a vigorous campaign
against the disease as a systemic one, and that local treatment is of
very little value. In this connection he advocates the use of iodine,
creosote, etc., given in conjunction with a protein, and says that in his
experience the results with these agents have been much better when
administered in this manner.

The chapter on Hypertrophic Rhinitis is exhaustive, much space
being given to the etiology of the affection as well as the pathology,
and excellent illustrations, many of them new, adding much to the text.
He objects vigorously to Seiler's prophylactic treatment, thinking that
in some cases it may rather increase than diminish the tendency to
catarrh. He also deprecates the use of acids in the reduction of
hypertrophies, relying more on the saw and the knife as well as the
electro-cautery. In ozæna he does not agree with the generally accepted
opinion that the fetid odor is due to a biochemical action upon the
retained secretion in the nasal chambers, but thinks it much more
likely that the phenomenon is not alone the result of their retention in
the nasal fossæ and the effect of ordinary putrefactive decomposition
thereof, but pus instead arises from some peculiarity of either the
secretion of the part or the histological elements exfoliated therefrom.

Of particular interest is the chapter on Intubation, the illustrations

of which are admirable. The book consists of some 750 pages, is written in an easy and readable style, and the text is amplified by over 200 illustrations, some of them taken from standard works, many of them original and all instructive. In the book are several pages of colored plates, showing normal and pathological conditions of the larynx and pharynx. There is also a chapter on local treatment, supplemented by an extensive formulary for sprays, inhalants, pigments, etc.

Dr. Shurley is well-known to the American profession as a laryngologist and rhinologist of high repute, and his contribution to the literature of the subject will undoubtedly be given the exalted position it deserves. G. M. C.

PROGRESSIVE MEDICINE. A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS IN THE MEDICAL AND SURGICAL SCIENCES. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia, etc., assisted by H. R. M. LANDIS, M.D., Assistant Physician to the Out-Patient Medical Department of the Jefferson Medical College Hospital. Vol. I., March, 1901. Surgery of the Head, Neck, and Chest. Infectious Diseases, including Acute Rheumatism, Croupous Pneumonia, and Influenza. Diseases of Children. Pathology. Laryngology and Rhinology. Otology. Philadelphia and New York: Lea Brothers & Co., 1901.

THIS volume marks the beginning of the third year of this publication, and this year it bears at the head of its title page the following proud and merited criticism of its predecessors, " Awarded Grand Prize, Paris Exposition, 1900." The need for a discriminating and attractive narrative of the year's progress in medicine—a very different thing from an unwieldy, undigested record of all medical doings—has been admirably met by these quarterly, well-chosen, and well-told stories of medical advance. The contributors' commentaries are valuable to the reader, and help him sit with them in judgment and form serviceable conclusions whether confirmatory or dissenting. The same topics are considered as in the initial volumes of the two preceding years, and the echo of colonial policies is heard in extended and satisfactory reports of tropical diseases and of the characteristics of modern small-bore-rifle wounds.

More than the first quarter of the book is well devoted to the Surgery of the Head and Chest. Dr. Da Costa elaborates the pathology of the conditions dwelt upon, and draws clear conclusions from an array of authorities. Because it ignores glandular involvement, he condemns the use of arsenious acid in the removal of cancer except when of slight extent and when limited to the skin. The best results in rhinoplasty are still achieved in traumatic cases, and the artificial metallic bridge is reported of occasional but uncertain success. Extensive operation is counselled for the jaw in malignant disease, the results being more permanent than supposed. A new method of urano-staphylorraphy by Ferguson and an ingenious closure of salivary fistula by Lydston are described. The Trendelenburg position is advocated for operations upon the pharynx, larynx, and trachea. For the control of hemorrhage

and the prevention of infection in penetrating wounds of the chest, pleurotomy and drainage is advised according to Le Conte and Terrier. Many instances are cited of non-intervention followed by recovery from perforating high velocity, small calibre bullet wounds of the chest. Such wounds are not immediately infected. "The majority of the reports relating to the surgical treatment of phthisis have been unfavorable, but occasionally the attempt succeeds." The intrapleural injection of nitrogen, as advocated in selected cases of phthisis by Murphy and Loomis, is recommended as worthy of a permanent place in treatment. Of much interest is the report of Charles A. Morton of an abscess of the lung successfully treated by incision of the pleura, suture of the lung to the chest wall, and, finally, by incision and drainage. Tapping is condemned and incision and drainage advocated in empyema and in purulent pericarditis. Suture is advised for wounds of the heart. The superiority and likewise the impropriety of using the mallet and chisel in opening the skull is debated, and von Stein's instrument reported as opening the skull in four minutes. If the latter proves as swift and safe as reported it will be in the opinion of the reviewer invaluable. Cushing's method of Gasserian ganglion removal is recommended as furnishing maximum exposure with minimum compression of bone and injury to bloodvessels. The reports of craniotomy for idiocy and hydrocephalus almost invariably testify that the operation is useless. The foregoing are a few of the conclusions of this condensed, exhaustive, and instructive article.

Infectious Diseases, including Acute Rheumatism, Croupous Pneumonia, and Influenza, by Frederick A. Packard, is the next contribution. It occupies one-quarter of the book's space, and is a most interesting and instructive chronicle of much scientific study rewarded by notable progress during the past year. It is especially rich in confirmatory knowledge of the bacterial origin of disease—also in the modes of transmission—and, finally, in methods of treatment largely bactericidal.

Five observers have furnished strong evidence of the presence, in the articular fluids of cases of rheumatic polyarthritis, of a diplococcus which, when injected into animals, reproduces this disease, and also the diplococcus in the joints. The frequent sterility of the articular fluids in human polyarthritis rheumatica is noted in contrast to the foregoing. In influenza the presence of its bacillus has been observed in vegetations on the aortic valves. The observer concludes that the bacillus can be disseminated through the bloodvessels or lymph-channels. Among the surgical complications and sequelæ of this disease are reported the inflammation of nerves, ostitis, osteoperiostitis, and osteomyelitis. There is further testimony of croupous pneumonia of infectious character and of the serum treatment of this disease. The presence of diphtheria and of the Klebs-Löffler bacillus is reported in a pony, which is noted as of interest in connection with the supposed immunity of the horse from this disease. The exposure of children to the contagion of measles to protect them from acquiring it in later life is condemned, it being preferable to completely escape it. There is confirmation of the etiological nature of the diplococcus scarlatinæ of Class. There is full report of an important observation by Clement Dukes of a " fourth disease," apt to be confused with rubella, and not unlike mild scarlet fever. The association of vaccination with syphilitic infection is characterized as absurd. For smallpox, salol, sixty grains daily, is reported to act

efficiently upon the micro-organisms secondarily infecting the vesicles. This drug is said to avert pustulation and prevent or minimize scarring. The transmission of malaria by the mosquito seems definitely proven by Manson's infection of himself by mosquitoes imported from Italy, the malarial parasite being observed in his blood. A counter-experiment at his suggestion was made in the Roman Campagna, where four people, protected from mosquitoes, dwelt from early July to late September without contracting malaria. The practical treasure of a very valuable and comprehensive review of a vast typhoid fever literature is contained in the following: If the presence of the typhoid bacillus has been observed in the lung and urine, pointing to the necessity of sputum and urine disinfection as well as that of the feces, it has been experimentally shown that typhoid infected water slowly sterilizes with continuous freezing; some bacilli were still found in ice nine weeks old; the leucopenia of typhoid gives place to leucocytes when perforation is imminent; the classic symptoms attributed to perforation are now assigned to post-perforative peritonitis; the reports of Cushing, of Packard and Le Conte, and of Shattuck, Warren, and Cobb emphasize the necessity of the earliest recognition of perforation, the advisability of prompt exploratory laparotomy in the presence of abdominal symptoms, and the tolerance of typhoids locally anæsthetized to this operation. Plague, and the investigation of its prophylaxis; dysentery, and the confirmation of Flexner of Shigo's bacillus, and the observation of Malta fever in Puerto Rico, the Philippines, and several portions of the British Empire are all noted in extensive chapters on these diseases.

The Diseases of Children, by Floyd M. Crandall; Pathology, by Ludvig Hektoen; Laryngology and Rhinology, by A. Logan Turner, and, finally, Otology, by Robert L. Randolph, are most completely reviewed. Lack of space prevents more extended comment.

On laying down this volume of *Progressive Medicine* one is impressed, as by its predecessors, with the vast array, the condensation, and the judicious selection of contemporary testimony presented—a tribute to the contributors, editors, and publishers naturally follows, and the concluding reflection is reached that without such a publication and reference to it most men must remain culpably ignorant of the medical thought and advance of the day. J. M. S.

INFANT-FEEDING IN HEALTH AND DISEASE. A Modern Book on all Methods of Feeding. For Students, Practitioners, and Nurses. By LOUIS FISCHER, M.D., Attending Physician to the Children's Service of the New York German Poliklinik; Bacteriologist to St. Mark's Hospital; Professor of Diseases of Children in the New York School of Clinical Medicine; Attending Physician to the Children's Department of the West Side German Dispensary; Fellow of the New York Academy of Medicine, etc. Containing 52 Illustrations, with 16 Charts and Tables, mostly original. Pp. 368. Philadelphia: F. A. Davis Company.

THE study of the best methods for the feeding of infants and young children has opened such a wide field for research that contributions to the literature of the subject by men of experience are always wel-

come. The subject is one of particular interest to both the general practitioner and medical student, for as yet far too little is known, especially as to how a young child can be properly fed by artificial means. The little book before us is written with a view of bringing before the general practitioner the best modern methods of infant feeding in the plainest manner possible, and having been written by a gentleman of unusually wide experience in this department of pediatric medicine, ought to be a work of value to its readers.

The author has divided his book into two parts: the first commences with a description of the infantile digestive tract and its ferments; then follows the chemistry of milk, breast-feeding, and kindred subjects, and the modification of cow's milk. The section on Digestive Ferments and their Chemistry is very thorough and contains the most recent work on the subject, but in our opinion the style of the article would be improved if the sentences were longer and more complete. The continual use of authors' names in parentheses distracts the attention. These references might have been indicated by numbers referring to the list of quoted authors which is at the end of the book.

The section on the Chemistry of Milk is very good except for the same constant bracketing of authors' names. The section on Breast and Artificial Feeding shows very well the wide experience of the author and his careful study of the details of a specialty in which attention to details is of so much importance. We are glad to note how much simpler the methods of calculating milk elements are becoming, and those described are the least complicated we have yet seen. We think, however, that reference should have been made to the accurate and painstaking works of Westcott, Bauer, and others in this line.

The second part of the book deals chiefly with feeding by infant foods, and here we are sorry not to be able to share the author's enthusiasm in the results obtained from the use of Gaertner's mother's milk and some other foods of the same class.

A number of very practical points are given, among these a series of diet lists for a nursing mother, on pages 76 and 77; the tests for the adulteration of milk, and the section on the Feces of Infants, the latter being a subject about which far too little is known.

Some errors in proof-reading, such as are common to all first editions, are noted; thus on page 73, in the thirtieth line, "is" should be "are." The paragraph beginning with the tenth line on page 82, referring to the maintenance of wet-nurses in foreign hospitals, might be improved in construction. The phrase "quite some," page 279, is undoubtedly an oversight in proof-reading.

We are pleased to see that the author's experience of milk laboratories exactly coincides with our own.

We take pleasure in recommending Dr. Fischer's book, and feel certain that it will not only be a valuable aid to the general practitioner and student of medicine, but will also do a good work in aiding the spread of the knowledge of the important but as yet little understood subject of scientific infant feeding.　　　　　　　　　　W. H. W.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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The Basophilic Granulations of the Red Blood-corpuscles.—O. MORITZ (*Deutsch med. Wochenschrift*, 1901, xxvii., p. 68).

While most authors have been under the impression that the basophilic granulations sometimes observed in the red blood-corpuscles are evidence of degeneration which may have some importance from a diagnostic standpoint, others have believed that they are unimportant artefacts or postmortem phenomena. Grawitz has produced them in mice by heating; Strauss, in frogs and in the rabbit by pyrodin, and Hamel by the feeding of lead to white mice. Moritz, in a series of investigations, succeeded in producing the basophilic granulations in all of five rabbits fed upon pills of acetate of lead, and in one in which the acetate was given subcutaneously. They were found in greater number in two rabbits to whom pyrodin was given subcutaneously. He is further able to support Hamel's observations, that six workers in a lead-color factory, only one of whom had any suspicious signs of lead intoxication, while another had shown symptoms some time before, all showed typical basophilic granulations of the erythrocytes. He has found these granulations also in five other cases: twice in leucæmia, in malaria, sepsis, and carcinoma cachexia.

Excretion of the Bence-Jones Body in the Urine (Albumosuria) in Association with Myelomata of the Ribs. — KALISCHER (*Deutsch med. Wochenschrift*, 1901, xxvii., p. 54).

The patient was a woman, aged sixty-seven years, whose family history was negative; one daughter had died of pernicious anæmia. In July, 1899, the patient began to complain of neuralgic pains in the lower part of the thorax, and of difficulty in breathing. These pains, in the beginning spasmodic, later became permanent and lasted up to the death of the patient.

There were also eructations and nausea, in association with a sensation of præcordial anxiety, coming on without any relation to the taking of food. After December, 1899, the patient was unable to leave her bed on account of the pains which were brought on by walking, sneezing, coughing, or bending, and on account of general weakness. The physicians in charge made a diagnosis of hysteria and neurasthenia. The examinations of the urine were negative, showing only once, toward the end of this period, a trace of albumin. In July, 1900, the patient was first seen by Kalischer. She could not move forward on account of severe pains in the chest, which increased with every step and were continuous, with occasional sharp exacerbations. No abnormalities were to be discovered in the internal organs or central nervous system ; the eye-grounds were normal. Sensibility of the skin was normal, except for a hyperalgesia on touching the lower anterior part of the chest. There was especial tenderness over the points of junction of the cartilages and the bones of the fifth, sixth, seventh, and eighth ribs on the left side. There were also some points on the sternum, clavicle, and scapula which were painful on pressure. At that time the only complaints were of a continuous bitter taste in the mouth, loss of appetite, general weakness, and sensation of anxiety. The urine showed an average daily amount of from 1800 to 2000 c.c.; reaction neutral or slightly alkaline ; specific gravity 1015 ; trace of albumin ; no casts. On further examination it was found that, on heating the urine to a certain degree, there was a profuse precipitate and clouding, which cleared up on further heating, disappearing entirely on boiling, but coming down again on cooling. There was a profuse precipitate with nitric acid appearing in the cold, dissolving by heat, and appearing again when the urine cooled. The cloudiness appeared at 55° to 60°, the clearing at about 85°. Later a striking softness and bowing, with angular depressions and prominences of the ribs, from the third to the eleventh, became evident; this was especially marked at the junction of the ribs and cartilages. Swollen tender points were noted on the sternum, clavicles, and scapula. Every movement of the arms, mere turning, a deep breath, or too active speaking caused severe attacks of pain. Rapid emaciation, increased anxiety, and fainting attacks followed. Examination of the blood showed a slight increase in the number of leucocytes ; nothing remarkable in the red blood-corpuscles. The urine diminished from 600 to 800 c.c. a day. At times albumin was found, but the Bence-Jones body was continuously present up to the time of death, which occurred in the middle of November, about a year and a half after the onset of the disease, resulting from increasing weakness and paralysis of the heart. Only a partial autopsy was allowed. Despite careful handling of the body, palpation showed fractures, depressions, and angular protrusions of the ribs, as well as slight swellings and irregularities of the surface of the ribs, sternum, clavicle, and scapulæ. The ribs felt soft and were abnormally movable. The anterior part of the ribs from the second to the eighth on the left side were removed. They could be readily cut with ordinary scissors, while from the surface a brownish-red pap-like substance similar to splenic pulp welled up. The spongy and compact bone substance of the ribs had almost entirely disappeared, leaving only an external shell as thin as paper. All the ribs were easily broken, and showed various fractures, and, on the left, diffuse club-

shaped swellings, or, again, more localized, yellowish elevations from the size of a lentil to the size of a pea, and extensive roughnesses and unevennesses especially on the posterior and lower surfaces. Angular protrusions were also to be felt over the posterior parts of the ribs. Nothing abnormal was noted in the pleuræ, pericardium, heart, or lungs. With the ribs there was also removed a piece of bone from the under part of the right humerus. Here the marrow had its normal color, except for small reddish-brown spots, and neither the compact substance nor the spongiosa had disappeared. There was no widening of the medullary canal. Smear preparations from the marrow and the diffusely diseased ribs showed that, in the ribs, there was a well-marked increase of the colorless round cells without " tumor elements " or foreign structures. The condition might then be assumed to be a hyperplasia of the marrow of lymphoid character (myeloma). The marrow of the humerus was normal microscopically as well as macroscopically. The author points out the similarity of the case to the few others which have been reported in literature.

The Etiology of Yellow Fever.—The preliminary report of Reed and his associates on the etiology of yellow fever has already been reviewed in the February number of this JOURNAL. REED, CARROLL, and AGRAMONTE (*Journal of the American Medical Association*, February 16, 1901, p. 431) recently read a report of their subsequent investigations at the Pan-American Medical Congress, held in Havana, Cuba, February 4 to 7, 1901. Their recent investigations have been directed toward ascertaining the mode of transmission of the disease from individual to individual rather than toward studying the specfic agent of the disease. In their previous report they concluded that the mosquito (culex fasciatus, Fabr.) was responsible for the transmission of the disease. This later work was undertaken largely with the object of confirming these conclusions if possible.

In order to eliminate all possibilities of the disease being contracted from any other source they established a camp, which they called Camp Lazear, in honor of their late colleague, in an open field one mile from the town of Quemados, Cuba. The camp was established on November 20, 1900, after which time it was strictly quarantined, the only persons allowed to leave or enter the camp being three immune members of the detachment and the members of the board. The personnel of the camp consisted of two physicians, one of whom was immune ; one immune hospital steward ; nine privates of the hospital corps, one of whom was immune, and one immune ambulance driver. A few Spanish immigrants were admitted to the camp from time to time during the investigation. Before the experiments were begun all non-immune individuals were kept in the camp longer than the full period of incubation of yellow fever.

Six non-immune persons were allowed to be bitten by mosquitoes (culex fasciatus) which had previously bitten yellow fever patients. Of these six individuals five contracted yellow fever within the period of incubation of the disease. The negative result was in a case which had been inoculated with a mosquito on the fifteenth day after the insect had bitten a case of yellow fever on the third day. They have an explanation for this negative result, however. They subsequently found that in the case of an insect kept

at room temperature during the cool weather of November, fifteen or eighteen days is, in all probability, too short a time to render it capable of producing the disease. Their observations indicated that it takes a certain number of days after the parasite has been taken into the mosquito's stomach before it reaches the salivary glands of the insect and before it can thence be reconveyed into man. This period averages twelve days in summer and eighteen or more days during the cool winter months.

Having, in their minds, conclusively shown that yellow fever can be transmitted by the mosquito they endeavored to ascertain whether it can be conveyed in any other way. Accordingly four individuals were inoculated with blood taken from the general circulation of patients in the acute stage of yellow fever. Three of the four cases developed yellow fever.

They then proceeded to ascertain whether yellow fever can be conveyed by fomites. For this purpose a small frame house consisting of one room 14 x 20 feet was constructed. It was made in such a way as to exclude direct sunlight and mosquitoes. For twenty nights a non-immune physician, Dr. R. P. Cooke, and two non-immune privates of the hospital corps slept in this building. Each night they unpacked and in the morning repacked three large boxes filled with sheets, pillow-slips, blankets, etc., contaminated by contact with cases of yellow fever and their discharges. These articles were hung about the room during the night, and also placed on the bed occupied by Dr. Cooke. At the end of twenty days these three individuals were placed in quarantine for five days and then given their liberty. None of them had developed yellow fever. Subsequently four other individuals for periods of twenty days either slept in the sheets or night clothing which had been contaminated by the discharges of yellow fever patients without contracting the disease.

They then proceeded to demonstrate how house infection with yellow fever occurs. A house similar to the previous one was constructed, only full provision for light and ventilation was made. It was divided into two compartments separated by a wire screen. All articles admitted to this building were first carefully disinfected. In one of the compartments fifteen mosquitoes previously infected by biting yellow fever patients were set free. Two individuals were admitted to the compartment with the mosquitoes and were bitten. One of the two developed yellow fever.

The authors state that at Camp Lazear of seven non-immunes whom they attempted to infect by means of the bites of contaminated mosquitoes they have succeeded in conveying the disease in six, or 85.7 per cent. Out of a total of eighteen non-immunes whom they have inoculated with contaminated mosquitoes, since they began their investigations, eight, or 44.4 per cent., have contracted yellow fever.

The conclusions from their investigations are as follows :

1. The mosquito—c. fasciatus—serves as the intermediate host for the parasites of yellow fever.

2. Yellow fever is transmitted to the non-immune individual by means of the bite of the mosquito that has previously fed on the blood of those sick with this disease.

3. An interval of about twelve days or more after contamination appears to be necessary before the mosquito is capable of conveying the infection.

4. The bite of the mosquito at an earlier period after contamination does not appear to confer any immunity against a subsequent attack.

5. Yellow fever can also be experimentally produced by the subcutaneous injection of blood taken from the general circulation during the first and second days of this disease.

6. An attack of yellow fever, produced by the bite of the mosquito, confers immunity against the subsequent infection of the blood of an individual suffering from the non-experimental form of this disease.

7. The period of incubation in thirteen cases of experimental yellow fever has varied from forty-one hours to five days and seventeen hours.

8. Yellow fever is not conveyed by fomites, and hence disinfection of articles of clothing, bedding, or merchandise, supposedly contaminated by contact with those sick with this disease is unnecessary.

9. A house may be said to be infected with yellow fever only when there are present within its walls contaminated mosquitoes capable of conveying the parasite of the disease.

The Pathology of Herpes Zoster and Its Bearing on Sensory Localization.—HEAD and CAMPBELL (*Brain*, Part III., Autumn, 1900) have recently published a most exhaustive and painstaking study on the above subject. In their introduction to the subject they state that they have determined the pathological lesion which underlies this disease, and have attempted thereby to determine the cutaneous distribution of certain fibres that enter each posterior root ganglion. Bärensprunz, in 1861, was the first to state that herpes zoster was of nervous origin. He was fortunate to secure an autopsy on a case, the study of which led to the universally accepted view that the herpes was associated with a lesion of the posterior root ganglion. The writers point out that although Bärensprunz rightly placed the lesion in the posterior root ganglion, he thought that this structure stood in no connection with the fibres of the posterior root or peripheral nerve, but had special nerve fibres of its own. Up to the time at which Head and Campbell commenced to investigate the pathology of herpes zoster there had been only two well reported autopsies on cases of zoster ophthalmicus and five satisfactory reports on zoster of the trunk. To this number they themselves add twenty-one cases at all stages after the eruption. The authors divide their report into three parts. In Part I. they take up the pathology of herpes zoster.

The changes in the ganglion of the posterior roots vary according as to whether they are acute or chronic. The acute changes consist of (1) extremely acute inflammation with the exudation of small round deeply-staining cells ; (2) extravasation of blood ; (3) destruction of ganglion cells and fibres ; (4) inflammation of the sheath of the ganglion. If severe such a condition eventually leaves a scar in that part of the ganglion affected and leads to thickening of the sheath over the affected area. On the other hand, if the eruption has not been severe all traces of the inflammation present in the acute stage may pass away, leaving the ganglion apparently normal.

The changes in the posterior nerve roots are somewhat similar. They consist of an acute degeneration followed by a greater or less amount of secondary sclerosis according to the severity of the acute destruction. The anterior root was always normal.

In the peripheral nerves they state that degeneration seems to appear, to disappear, and to be replaced by sclerotic changes at the same periods after the initial lesion in the ganglion, as was the case with the posterior roots.

The changes in the spinal cord are practically the same as those which follow division of a posterior root or excision of a posterior root ganglion experimentally. There is an acute degeneration of the root fibres in the posterior columns of the cord from the point of entrance of the fibres from the involved root.

Zoster of the branches of the trigeminal is associated with a similar lesion in the Gasserian ganglion to that found in the posterior root ganglion in cases of zoster of the trunk and limbs. This lesion causes secondary degeneration in the sensory root of the Gasserian ganglion, both in its extramedullary and intramedullary course.

The authors state that a herpes zoster, in all respects resembling that arising spontaneously, may be produced by implication of a posterior root ganglion in inflammatory processes secondary to malignant disease, tubercle or injury. They also refer to the occasional appearance of herpes in cases of organic diseases of the nervous system. A short chapter is devoted to a consideration of the changes in the skin and lymphatic glands. They point out the curious fact that although the serum of the vesicles is sterile yet there is enlargement of the associated lymphatic glands.

An interesting chapter is devoted to a discussion of herpes zoster as an acute infectious disease of the nervous system. It has its prodromal period in which fever and pain may be the only symptoms. With the appearance of the rash the disease declares itself. They compare the disease to acute lobar pneumonia. The rash in herpes appears generally on the third or fourth day, just as the physical signs of pneumonia become well marked usually on the third or fourth day. Other evidences in favor of the infectious character of the disease are the infrequency of second attacks, and the occurrence of definite epidemics. They have met with only four instances of second attacks in over four hundred cases, and they have repeatedly noted the tendency of the disease to prevail at certain periods.

They draw an analogy between anterior poliomyelitis and herpes zoster. Just as in the former the unknown poison picks out the motor cells in the anterior horns, so in herpes zoster the unknown poison selects the posterior root ganglia. From a table compiled from 392 cases they show that the ganglia most commonly affected are those which receive afferent impulses from the viscera through the white ramus of the sympathetic. The posterior root ganglia contain two types of cells, large, coarsely-granular nerve cells and smaller more pear-shaped cells, which stain more uniformly with methylene-blue. They find that in herpes zoster the ganglia which are most frequently involved are those which contain a preponderance of the small cells, which give rise to the shorter fibres of the posterior columns of the cord. These small cells, among other functions, are believed to subserve pain, as Münzer has shown that the long tracts of the posterior columns do not conduct pain impressions to the cerebrum. Hence the intense pain which accompanies an attack of herpes zoster. They do not believe that the eruption of herpes zoster is produced by disturbance of special trophic nerves, but by intense irritation of cells in the ganglion which normally subserve

the function of pain, and more particularly that form of pain produced by afferent visceral impulses.

In Part II. the writers discuss the bearing of the distribution of the eruption in herpes zoster on sensory localization. Before they began this research Head had collected a large number of cases of herpes zoster, and had constructed a diagram to show the relation that the areas occupied by the eruption bore to one another. A series of segments was thus mapped out upon the surface of the body, and to each segment was given a hypothetical number which was supposed to represent its numerical localization in the central nervous system. This numerical localization met with universal disbelief alike from anatomists and clinicians, and Head felt that if a postmortem could be obtained on a case of herpes zoster in which the distribution of the eruption had been carefully drawn or photographed the question might be settled one way or another. Head and Campbell eventually were able to secure autopsies on twenty-one cases of herpes thus previously studied. This material has enabled them to deal with the question of numerical localization in a complete manner. In their diagram and in the text the name used to designate the skin areas refer to a definite posterior root ganglion. Thus " the fourth dorsal " area means that that area corresponds with disturbance of the fourth dorsal ganglion. The clinical study of these cases, with the confirmation obtained from the post-mortem, showed that their original diagram of the areas was in its main essentials correct. They show that these areas may vary markedly in different individuals, owing to variations in the surface from stretching of the skin, as in the mammary region, without any necessary alterations in nerve supply.

In conclusion, they believe that when a certain ganglion is affected the eruption most frequently lies over a definite tract of skin, which may be called the normal area from which fibres enter that ganglion. This tract of skin may, however, in some cases be situated further headwards, and occupy about one-half or less of the area usually supplied by the segment in front (pre-fixed). It may be situated further toward the " tail end " of the body (post-fixed) to the same extent. But its displacement never exceeds half an area in either direction, and in no case did they find that an eruption, which lay over what they supposed to be the complete normal area of a certain segment, was produced by a lesion of either the ganglion above or the ganglion below. They found, further, that the areas marked out by the eruption of herpes zoster overlap one another to a very variable extent. On the trunk this overlap was slight when individual differences and variation in nerve supply were taken into account. In the neck the overlap consisted more of a sharing of a certain territory than of true overlap, but on the limbs the overlapping was distinct. In no case did the overlap equal in extent more than one-half of the area above and below, while in many cases it was considerably less.

Part III. contains the clinical and post-mortem reports of their twenty-one cases of herpes zoster in which they secured autopsies, and from which they drew their conclusions already given. The report is accompanied by numerous figures and seventeen plates.

SURGERY.

UNDER THE CHARGE OF

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Prophylaxis in Asepsis.—HAMMESFAHR (*Centralblatt für Chirurgie*, November 24, 1900) states that, as the result of the experiments which have been performed for the perfection of the customary methods of disinfecting the hands, one must acknowledge that the hand infected with virulent micro-organisms cannot be disinfected by the usual methods of disinfection so that it cannot become infected again. It is comparatively easy for the operator and his assistants to avoid infection by wearing rubber gloves and taking care to remove all infected dressings with sterilized forceps. The examination of suppurating wounds, the vagina, and the rectum should always be made with the examining fingers protected by rubber finger-cots; in all septic operations or in the washing out of infected wounds the operator and his assistants should wear rubber gloves. These gloves in order to be useful must not interfere with the touch, should fit tightly, and must be durable and capable of being absolutely sterilized. When the hands of the operator and his assistants are so protected from infection it is possible so to disinfect the hands in the case of an aseptic operation that from their side the danger of infection is practically *nil.* In difficult and delicate aseptic cases—in contradistinction to the septic—the gloves may be a hinderance. Also one need not avoid so assiduously touching the wound with the hand, as Steinthal and more lately König have recommended. Certainly each unnecessary touch or handling of the wound is bad, but every surgeon knows that the finger in many cases cannot be replaced by an instrument. Not only should the surgeon's hand be prevented from coming in contact with the septic materials, but he should also take care of the skin and nails. It is self-evident that a hand with a smooth surface and carefully cleansed nails is easier to sterilize than a rough hand. As Gottstein has stated, " A female hand is more easily disinfected than a male hand."

The Treatment of Fractures of the Patella.—WIENER (*Centralblatt für Chir*, January 5, 1901) states that fractures through the quadriceps muscle do not heal without artificial aid. The union of the fractured parts, near the muscle, is hindered by the great mass of liquid exudate upon which the fracture is in a measure supported. The treatment of opening the joint and evacuating the exudate, then bringing the fragments together by sutures,

has two disadvantages : the necessity of securing absolute asepsis and the difficulty of securing the patient's consent to operative interference. The author's method of treatment consists in covering in the leg with a bandage, then applying a plastic-fibrous splint around the affected knee. The knee is then surrounded by a generous layer of cotton, and then a rubber bandage 8 to 10 cm. wide is tightly applied. The patient is then able to walk with but slight difficulty, even though at this time there is not complete approximation of the fragments because of the exudate. The rubber bandage is retained in place for four or five days, and then removed. Examination at this time will show that the effusion has nearly entirely disappeared, and the fragments can be nearly approximated. The bandage is reapplied, but more tightly than at first; interference with the circulation is not to be feared, because the bloodvessels are amply protected by the splint and the cotton. This method causes the effusion to be absorbed very much faster than by the use of massage or any other method. In one case the circumference of the knee was decreased in four days from 43 cm. to 37 cm. This treatment is also very serviceable in cases of acute traumatic arthritis. In one case in which there had been a bad rupture of the ligaments of the inner side of the right knee-joint, three hours after the accident the joint was filled with effusion ; fourteen days later the patient could flex his leg to a right angle.

Some Personal Observations on the Effects of Intrapleural Injections of Nitrogen Gas in Tuberculosis.—LOOMIS (*New York Medical Record*, September 29, 1900) states that the gas is best injected with the patient sitting in bed and that the best point of insertion for the needle is behind the posterior axillary line, in about the eighth interspace, the chest being sterilized in the usual manner before the injection is made. The quantity of gas to be injected will vary considerably, and will range from fifty to two hundred cubic inches, the amount varying in each case according to the dyspnœa, distress, irregularity of the heart, and displacement of the mediastinal contents. In no case have any bad results followed the injection. Having injected as much gas as possible, the trocar should be withdrawn and the puncture closed with collodion and a firm compress, and adhesive plaster placed over the compress. Practically no unpleasant effects follow these injections. Respirations are always increased, and the pulse-rate is generally lowered. One of the most constant effects noted after injection is that there will be a marked increase in the expectoration during the first twenty-four hours, and that after the first few days expectoration diminishes rapidly. The gain in weight is usually constant and often excessive. Night-sweats generally disappear as the patient's general condition improves. There is usually marked improvement in the subjective symptoms after the injection, such as diminution in the pulse and expectoration, rapid gain in weight and strength, stoppage of hemorrhages and night-sweats, and improvement of the appetite. The author analyzes his eighteen cases as follows : For pulmonary hemorrhages, eight cases ; for effect on lungs, ten cases ; with the following results : effect on hemorrhage stopped at once ; effect on lung condition, in the majority of cases the physical signs remained the same except that râles diminished or disappeared. Only one case showed a

marked improvement. Pleurisy was controlled at once. The number of cases which gained in weight was sixteen, and the average gain in weight was seven and one-half pounds per patient. No cases lost weight. The average amount of gas injected was 107½ c.c. Improvement was noticed in the cough in thirteen cases, in expectoration in eleven cases, in fever in four cases. The injections were tried and failed, owing to inability to introduce the gas by reason of adhesions, etc., in eight cases. The author states in conclusion that he is convinced that intrapleural injections of nitrogen gas will have a permanent place in the treatment of pulmonary tuberculosis. That it is a treatment that has a future ; that in no cases have any bad results or even unpleasant effects followed the injections ; that although in no cases has there been an absolute cure of the disease, still there has been an apparent arrest in two cases and a disappearance of such constitutional symptoms as expectoration, fever, and cough in a number more. Sufficient time has not yet elapsed to say whether in even the most favorable cases the activity of the disease may not return. The local improvement is not as apparent as the constitutional. A marked gain in weight was found in every case injected. In not a single case did this method of treatment fail to stop pulmonary hemorrhages.

Large Abscess of the Breast in a Girl, aged Sixteen Years.—MORESTIN (*Bull. et Mém. de la Soc. Anat de Paris*, December, 1900) reports the case of a girl, aged sixteen years, who had a large abscess of the left breast. There was no pain on examination, and the whole course of the case had been of a non-inflammatory type. The history was that six weeks ago she had received a slight traumatism to the left breast as she was closing a window. This caused her but little pain, but she was in only fair health at this time, and the traumatism undoubtedly produced a favorable soil for the growth of any latent infection. One year before she had had a large abscess of the left axilla which opened spontaneously. She had also had when young an enlargement of the submaxillary and cervical glands. An operation was decided upon as the only means of relieving the abscess, and so an incision was made, and over a litre of pus was evacuated. The patient made an uninterrupted recovery. Examination of the pus showed it to contain only staphylococci, and inoculation of guinea-pigs proved negative for tuberculosis.

The Treatment of Tuberculosis of the Spine.—WIENER (*Medicine*, February, 1901) reports a fatal case in which the autopsy revealed a caseous mass replacing the body of the sixth dorsal vertebra. This mass was covered by fibrous tissue which was easily ruptured. There was no evidence of any pressure on the cord or of any gross change in the dura mater. On the posterior wall of the pleural cavity was a similar mass, not involving the ribs. There were no tubercles in the lung. There was an adhesive pleurisy of the left side, evidently of recent origin, and the left kidney showed several tubercles in the cortex. There were no tubercles in the other organs and the mesenteric glands were only moderately enlarged. What is to be hoped from the treatment of such a case by Calot's method ? Where is the bone to come from which is to fill the gap left by the destruction of the sixth

vertebra? With the periosteum mostly gone and the vertebral epiphyses destroyed, we cannot conceive of the formation of those bridges of bone which, as Calot asserts, connect the severed vertebræ. In the year after Calot's publication much was written upon the subject. Now that the time has arrived when final results ought to be known in cases operated on two years ago, a cautious reserve is shown. Forcible correction is indicated in cases in which the deformity is of recent date. In these the operation is easy and is accompanied by little danger. Where paralysis does not yield to milder measures, it may be undertaken as a last resort, though the risk to life is very great. Pean describes the case of a girl, aged fifteen years, with an enormous kyphosis of the upper part of the spine, complicated with paralysis of the lower extremities. She had been treated by stretching for two years without benefit, when forcible correction and immobilization in a plaster jacket was followed by a prompt improvement in the paralysis. The gravitation abscess is both frequent and difficult to treat. There is a temptation to open these abscesses at the most prominent part and evacuate the pus, but this does not reach the seat of the difficulty. It only encumbers the patients with permanently oozing fistulæ, which are usually accompanied by mixed infection and amyloid degeneration, followed by the death of the patient. Such abscesses are rarely accompanied by fever, 101° F. being the highest recorded. The ordinary symptoms of sepsis are not present, and under favorable circumstances absorption may take place. The author has observed in the right iliac fossa of a man, aged forty-five years, a tuberculous abscess the size of a child's head, which disappeared without leaving a trace. In this case there was destruction of the first lumbar vertebra, and the only treatment employed was a permanent extension apparatus. The author states in conclusion that he wishes to urge upon each member of the medical profession to direct his efforts to the end that proper care be taken of the unfortunates afflicted with surgical tuberculosis in hospitals adapted for the purpose.

The Estimation of the Damage and the Source of the Hemorrhage in Cases of Hemorrhage into the Knee-joint.—LAUENSTEIN (*Centralblatt für Chir.*, February 9, 1901) states that several methods of treatment have been recommended. Among these are the "ambulant" method, the "expectant" treatment, treatment by massage, etc. Other surgeons recommend the immediate evacuation of the bloody effusion. In many cases it is difficult or impossible to accurately determine the exact amount of injury that the joint has sustained, as the effusion soon masks all physical signs, and it is impossible to tell the extent of the rupture of the capsular ligament. The author's treatment has been to evacuate the effusion as soon as possible, then to apply a tight bandage and maintain the joint at rest for several weeks. The patient is not allowed to walk nor are passive motions begun until sufficient time has elapsed for the capsular ligament to have completely healed. In those cases where the effusion is complicated by a fracture of the patella or condyle of the femur, it is the author's custom to evacuate the effusion before putting the joint at rest in splints. The only method of removing the effusion from the joint is by evacuation, either through an incision or by the use of a trocar and canula. The advantage of the speedy removal of

the effusion is that the torn edges of the capsular ligament are brought in
good apposition, and thus the tendency to rapid healing is promoted. The
tear in the capsular ligament is usually in that segment of the joint which
is most exposed, which is the part lying to the outer side of the patella.
After evacuating the effusion through a trocar and canula, it is easy to
demonstrate the wound of the capsular ligament by introducing a small
sound through the canula into the joint. The puncture is best made, as a
rule, on the outer side of the joint. The Röntgen rays will be found a
valuable aid to diagnosis in all affections of the knee-joint. In all cases of
injury of the knee-joint it is most important that good union be secured
before any attempt is made to use the joint.

The Treatment of Difficult Cases of Scoliosis.—BADE (*Centralblatt für
Chir.*, March 9, 1901) states that the work of the past few years has clearly
shown that a proper combination of gymnastics, massage, and braces are
the important factors in the treatment of scoliosis. Which type of brace is
the best is still to be determined. The old Sayre " corset " of gypsum or
plaster-of-Paris has recently been the subject of much favorable discussion.
It is usually applied by the method of Calot. This consists in applying the
jacket while the vertebral column is forcibly extended, and retaining the
jacket for any time up to three months. Schanz has gone energetically for-
ward with the " redression " treatment. After correcting the deformity as
much as possible, he applies the plaster-of-Paris jacket. After its removal
he attempts to retain the correction by means of gymnastics and then the
reapplication of the jacket. The author applies the plaster jacket after
immobilizing the spine, as a permanent extension of the spine is only pos-
sible when the head and the pelvis are included in the fixation. As the
patient grows in the gypsum jacket the jacket should be correspondingly
enlarged, care being taken that the extension is fully maintained. In order
to accomplish this the author uses the apparatus designed by Schede for the
treatment of spondylitis. As the children become thinner the deformity of
the projection of the ribs becomes larger, or at least it is not reduced. In order
to accomplish the reduction of this deformity while the patient is wearing
the gypsum jacket, the author advises the use of continual pressure. Wull-
stein advocates the use of a pressure pad of gauze soaked in plaster-of-Paris,
which will not permit of any regulation of the degree of pressure. The
author's method consists in the use of a pressure pad that is made in two
parts. One plate lies closely to the projecting ribs, while the second plate
fits tightly on the inner side of the jacket. These plates are joined together
by a screw whose outer end protrudes outwardly. By turning this screw the
two plates are approximated and the decrease of the deformity is accom-
plished. The author believes that his method of treatment accomplishes
the permanent self-assisting extension of the vertebral column with the use
of a plaster-of-Paris jacket, and the return to normal of the projection of the
ribs through the gypsum wrapping.

A Critical Review of the Literature of Gumma of the Spermatic Cord,
with the Report of a Case.—GOLDENBERG (*Journal of Cutaneous and
Genito-urinary Diseases*, March, 1901) states that syphilitic affections of the

spermatic cord are very rare, and when they occur they generally accompany a syphilitic orcho-epididymitis. A review of the literature shows but nine cases in which the spermatic cord was involved. The author reports the case of a man, aged twenty-three years, who presented himself with a round, sharply circumscribed, hard mass, slightly cystic in feeling, about 2 cm. in diameter, giving a sense of fluctuation, on the left posterior surface of the scrotum, about one-quarter inch from the raphé. Operation was decided upon, and on incision the mass was found to be adherent to the skin by inflammatory exudate and closely connected with the cord. It was not sharply circumscribed, and it had extended somewhat into the surrounding tissues. A pathological report proved the tumor to be a gumma with secondary inflammatory changes.

PEDIATRICS.

UNDER THE CHARGE OF

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Uricæmic Headache in Children.—CAUSSADE (*Thèse de Paris*, July, 1900) details four unpublished observations upon this condition and describes the syndrome. The crises of this cephalalgia approach migraine. The child comes of arthritic stock, but beside hereditary influence the diet is also in part responsible. The urine shows a high percentage of urea and an excess of uric acid and alkaline urates; sometimes, also, there are traces of albumin. Beside uric acid analogous bodies are also at fault (xanthine, paraxanthine, and heteroxanthine). According to Rachford, uric acid alone would not be poisonous, but xanthine and its derivatives, which are more soluble than uric acid, are very dangerous.

In all cases uricæmia is a manifestation of arthritism, and is especially liable to appear in the second nutritive period. The diagnosis is difficult. It rests at times upon a study of individual temperament and family antecedents. Treatment is very important; no overfeeding, regular meals, water or milk, white food, eggs, farinacea, cooked fruit, and no red meats. Heffron interdicts soups and extracts of meat, kidney, liver, acid fruits, beer, wine, coffee, tea, and chocolate in advanced cases. Water should be taken in abundance and constipation should be combated. Vegetables containing oxalic acid should be avoided (rhubarb, sorrel, asparagus).

The skin should be kept active by such exercise as is furnished by the bicycle and tennis, and by Swedish movements, and baths followed by friction. As medicines the alkalies are indicated, such as bicarbonate of soda

or potash, citrate of potash, magnesia, carbonate or benzoate of lithium, salicylate of soda, or Vichy water.

The Existence of Ductus Murmurs in the Newborn.—THEODOR ESCHE-RICH (*Jacobi Festschrift*, 1900, p. 327) relates the case of a newborn infant which presented the usual symptoms of congenital heart disease with rapid and superficial breathing and weak cry. The heart dulness was slightly increased, and there was a loud systolic murmur heard best at the base, but audible all over the chest. The second sound was clear, and marked accentuation of the second pulmonic was not observed. Cyanosis and weakness increased, and the infant died within twenty-four hours after birth. An ante-mortem diagnosis of congenital heart disease had been made. The autopsy showed the heart slightly enlarged but otherwise normal, without valvular lesion. The foramen ovale was closed, but the ductus arteriosus widely patulous. Both lungs showed extensive pneumonia at the bases. Auscultation of the fœtal heart sounds shortly before delivery had noted entire absence of murmurs. The author, therefore, believes that the murmur heard during life was produced by the stream of blood passing through the ductus arteriosus. He has observed a number of weakly and premature infants in whom weak superficial respiration has been a frequent symptom. These infants have frequent attacks of complete cessation of respiration with deep cyanosis. These attacks at first occur during or after feeding, or even without any apparent cause, at first rarely, but later more and more frequently until death occurs in one of them.

The attack usually begins with cyanosis, which increases steadily during the suspension of respiration ; it terminates spontaneously through irritation of the respiratory centre by CO_2, or after the application of irritants or artificial respiration. In one of these cases during the suspension of respiration the author was able to observe a distinct systolic murmur in the pulmonary area, which was not present during regular respiration and at the beginning of the attack, but was very distinct at the height of the asphyxia. He believes this murmur to have been produced in the ductus arteriosus by increased pressure in the pulmonary artery with a fall of pressure in the general arterial system, causing a current of blood to flow through the ductus. When respiration was re-established the pressure in the two arteries became equalized and the murmur disappeared. This he thinks the most plausible explanation of the intermittent character of this murmur, especially since examination of other infants during such attacks failed to reveal a murmur of this character.

The treatment of cases of this kind should consist in systematic stimulation of the respiratory centre by the Schultze method several times a day.

A Case of Apparent Recovery from a Congenital Abnormality of the Heart.—JOHN THOMSON, of Edinburgh (*Archives of Pediatrics*, March, 1901, p. 193) reports an interesting case under this title, which was brought to mind by reading Escherich's paper " On the Existence of Ductus Murmurs in the Newborn " in *Jacobi's Festschrift*, an abstract of which appears in this department for the present month.

The patient was a girl, aged nine weeks, the tenth child of apparently

healthy parents. Five of the other children had died in infancy or early childhood from various ailments, and one in adolescence from phthisis. The other three were living and in good health. The mother had had little rest during her pregnancy with this last child, but had not been ill. The baby was small and slept more than usual, but otherwise she had seemed normal. When first seen by the reporter she had slight beading of the ribs, and the hands, feet, and face, especially the lips, were distinctly cyanotic. The pulse was very rapid (156) and small, but regular, the respirations 36 ; the lungs and abdominal organs appeared to be healthy. The blueness of the extremities was noticed to vary in degree and to be worse when she cried.

The apex-beat was very indistinct, and was situated in the left fourth interspace about one-third of an inch outside the nipple line. No thrill could be felt, and no enlargement to the right could be detected. A loud systolic murmur was heard most distinctly over the base, especially to the left of the sternum, but was also audible in the other areas, in the axilla, and in the interscapular regions. The pulmonary second sound was normal and not accentuated. No clubbing of the fingers. Two months later, after regulation of the feeding, the child seemed better, and it was reported by the mother that she no longer turned blue, and on examination only very slight cyanosis of the feet and legs was noticed. The murmur was distinctly less loud, and over the tricuspid area it was quite inaudible.

Seven years after this the child showed no trace of cyanosis, and there was no clubbing of the fingers. The murmur had disappeared, the pulse was normal in rate and rhythm. No abnormality of the heart could be detected.

The author considers this to have been a case of patent and perhaps dilated ductus arteriosus corresponding with those described by Escherich.

General Emphysema Complicating Measles.—DAVID J. EVANS (*Montreal Medical Journal*, January, 1901, p. 8) reports this interesting condition in a boy, aged four years. The child was admitted to the hospital with a temperature of 102°, respirations 30, and pulse 148, with the rash well marked over the face and chest. The heart was normal, and a moderate bronchitis was present. The left ear was discharging, but this had been the case for some weeks before measles developed. The disease ran a moderately severe course. The cough, while troublesome at times, was never severe or paroxysmal.

Five days after admission the respiration became rapid and shallow, but no pneumonic areas could be detected. On the sixth day a diffuse swelling appeared in the left supraclavicular region, which was soft, non-crepitant, and evidently painless. Complete aphonia was also noticed. Next morning the swelling was found to have extended in all directions, though chiefly downward over the sternum as far as the fourth rib, and distinct crepitation could now be detected. Respirations were rapid and shallow, and the face was swollen and somewhat cyanotic. Later, crepitation could be obtained over the whole head, back, abdomen, and left arm, and extended down the left thigh as far as the knee. Temperature varied between 102° and 104°. On the eleventh day of the illness, under supporting treatment with whiskey and strychnine, the general condition was somewhat improved, though the

emphysema remained unchanged. As the general condition continued to improve the emphysema gradually disappeared, and on the thirteenth day the voice returned, but crepitation could be obtained in various areas for some days thereafter. Eventually complete recovery resulted.

THERAPEUTICS.

UNDER THE CHARGE OF

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Pharmacology of Anagyrine.—DR. OTTO LOEWI has reinvestigated the alkaloid found in *anagyris fœtida* which was formerly held to contain cystine and to have a strychnine-like action. He has found that there are probably two alkaloids, and that one, anagyrine, on which the investigations were made, more closely resembles lobeline, the alkaloid of Indian tobacco, than any other body; it is not, however, identical with this alkaloid. Its place in therapy is still to be determined.—*Archives Internationelles de Pharmacodynamie*, 1901, No. 8, p. 65.

Therapeutic Uses of Thyroid Extract.—DR. GEORGE R. MURRAY reviews the results which the ten years' use of thyroid gland in therapeutics has given. As is well-known, the function of the thyroid, among other things, is to form an internal secretion, the colloid material, which passes from the alveoli into the lymphatics of the gland, and is thus conveyed into the general blood stream, by which it is distributed to all parts of the body. This secretion plays an important part in the general metabolism of the tissues, which is but imperfectly performed when the supply of the secretion is absent or insufficient. The chief sphere of usefulness, therefore, is in the treatment of those conditions in which there is disease or destruction of the gland. Of the forms of administration the author says that the raw, fresh gland of the sheep may be given finely minced and mixed with glycerin, the usual dose being from one-eighth to one-quarter of a lobe. The liquid thyroid or the dried gland may also be employed ; the dried gland is perhaps to be preferred. Myxœdema is conveniently treated in two stages. During the first the object is to get rid of the symptoms and then restore the patient to health. During the second stage the degree of health arrived at by the first course of treatment must be maintained. In the first stage of an acute attack of myxœdema it is advisable to keep the patient in the house or even in bed

if there is any evidence of cardiac degeneration. The amount of thyroid should range from one-half grain a day upward. The second stage of the treatment lasts as long as the patient lives. Here it is advisable to ascertain the amount of gland substance daily elaborated and to keep this supply up by artificial means. In the treatment of cretinism much the same line must be pursued. Small doses should be given in the beginning. In some cases of goitre thyroid is of service, in others it is of little or no value. In the simple parenchymatous goitre of adolescents and young adults it is particularly useful. In some skin diseases it has been found of service. Psoriasis, ichthyosis, and tertiary syphilis have been benefited.—*Practitioner*, 1901, vol. lxvi., p. 389.

DR. P. BLAIKE SMITH records the results of therapy by thyroid extract in three interesting instances. The first patient was a woman, aged forty-four years, who had great general weakness and who on examination showed disseminated nodules studded over the entire front of the chest, neck, thorax, and axillæ. These nodules were carcinomatous and there was a carcinomatous ulcer of the breast. Five grains of thyroid extract were given twice a day and taken persistently for six months, being interrupted occasionally by cardiac symptoms. At the end of six months the nodules over the chest anteriorly and laterally and those of the abdominal wall had disappeared entirely. The patient had gained in weight and was much improved throughout. After stopping the use of the thyroid the nodules gradually returned, and three months after their disappearance as many as one hundred and fifty had returned. Thyroid medication again brought about improvement, but the general condition was approaching the terminal carcinoma stage and little was hoped for, although the progress of the malady seemed to be somewhat retarded. A second patient showed a peculiar skin eruption of a papulobulbous character, which was recurrent and persistent and not identified as any of the well recognized skin affections. This patient made a complete recovery on thyroid extract, one-half grain three times a day. The third case was one of obesity occurring in a man, aged fifty years, who had chronic Bright's disease in addition, and who, moreover, disregarded all dietary and other regimen. Five-grain doses of thyroid three times a day reduced his weight very materially.—*British Medical Journal*, 1901, No. 2098, p. 388.

Suprarenal Extract in Hæmoptysis.—DR. W. B. KENWORTHEY has obtained excellent results in pulmonary hæmoptysis by the administration of suprarenal extract in three-grain doses given every half hour until nine grains are taken; then one every two hours until nine grains are taken; then three grains daily for a week. The powder is best taken dry on the tongue, mixed with saliva and swallowed with water. In fourteen instances in which suprarenal was employed it controlled the hæmoptysis in every instance. In one patient only did the hemorrhage continue for more than fifteen minutes after the administration of the first powder.—*Medical Record*, 1901, vol. lix., p. 415.

Active Principles of Digitalis Leaves.—DR. J. W. ENGLAND gives a fair summary of the recent work done on digitalis, closely following Dohme's

recent critical *résumé*.   He contributes a new feature to the discussion in the preparation of a fat-free tincture.   It has not the acrid taste of the official tincture, and, unlike the latter, remains transparent on dilution with water. Its action, clinically, develops fifteen to forty-five minutes more rapidly than that of the official tincture, as it is more readily absorbed.   He further maintains that digitoxin is not the chief therapeutic agent in the leaves.— *New York Medical Journal,* 1901, vol. lxxiii., p. 573.

Sodium Salicylate in Diabetes Mellitus and Glycosuria.—Dr. R. T. WILLIAMSON has been observing for the past ten years the results of the use of sodium salicylate in the treatment of diabetes as originally recommended by Ebstein.   In the earlier years his experiments were tentative and small doses only were employed.   His results at that time were but nominal, but the patients all claimed that they felt better during the period of time of its administration.   Within recent years he has been increasing the dosage and now reports on twenty patients, some of whom, being in hospitals, were carefully followed.   The results obtained, diet and regimen being the same, seemed to prove that sodium salicylate in large doses, seventy-five to eighty grains daily, does have a marked effect in diminishing the amount of sugar in the urine.   Stopping of the drug would cause the sugar to reappear, to disappear on resuming the medication.   The author does not regard it as a specific, but claims that it is a useful adjuvant.   Certain patients do not take kindly to its use.   These need careful observation.—*British Medical Journal,* 1901, No. 2100, p. 761.

Superheated Dry Air.—Dr. Fr. NEUMANN advocates the use of superheated dry air (Tallerman) in the treatment of sciatica, arthritis deformans, and scleroderma.   In specially adapted instruments the temperature may be raised to 300° F. without danger to the patient.   The general stimulation of the circulation and of the respiratory excretion are the avenues of greatest action, and the marked stimulation of the lymphatic channels leads to more vigorous nutrition of the affected parts.   It is not wise to look for immediate results in the use of superheated air.   The affections usually treated are notoriously chronic, and have been developing for a long period of time, hence the processes of repair once started in the right direction may take a correspondingly long time to bring about the desired results.   The author gives the histories of a number of patients which are reported as cured.— *Lancet,* 1901, vol. clx., p. 923.

Sodium Cinnamate in Tuberculosis.—Dr. A. KUHN states that in view of the fact that the composition of balsam of Peru is not constant, especially in the amount of its cinnamic acid, the more stable product of sodium cinnamate has been introduced in Landerer's method of injection treatment for tuberculosis.   He reports on the results obtained with this preparation. He employed 10 per cent. solutions which were injected directly into a vein of the forearm in beginning doses of one-eighth of a grain every other day. The dose was gradually raised according to the general condition.   Eleven instances are reported in full.   The results were on the whole satisfactory. —*Münchener medicinische Wochenschrift,* 1901, vol. xlviii., p. 453.

Urea in the Treatment of Tuberculosis.—Dr. H. Harper has for the past year and a half been using pure urea in a large number of cases of different forms of tuberculosis, and believes it to be superior to any remedy which is used for this disease. He reports a number of clinical histories to support his views. The urea is given by mouth in doses of from forty to sixty grains, and also by hypodermatic injection in about the same amounts.—*Lancet,* 1901, vol. clx., p. 695.

[Inasmuch as the hygienic details were faithfully carried out it may be a question as to the rôle played by urea in the treatment. Confirmation certainly is required. The intrinsic evidence of the writer's paper does not necessarily carry conviction with it.—R. W. W.]

Treatment of Epilepsy.—Dr. L. Pearce Clark summarizes the present stand-point on this important topic as follows: A combination of diet, regular occupation, and personal hygiene with the bromides gives the best results in treating idiopathic epilepsy; the bromides, singly or combined, still remain the chief sedatives for the epileptic state—in the young epileptic, to secure a possible entire suppression of attacks and ultimate cure of the disease; in the adult, an amelioration of frequent paroxysms and comparative physical and mental comfort. The bromides to be effective in chronic and long standing cases must be given in large daily doses to suppress convulsions, from three to five hundred grains if necessary. They should be given gradually to find the sedative level, at which level it is the physician's principal duty to maintain them. Hot and cold baths, high enemas, alimentary antisepsis, and massage are absolutely essential to successful bromide medication. Bromine is a worthy substitute for the bromides in many cases in which the latter are contraindicated and cannot be given in high dosage. Salt starvation or semi-salt starvation is a great adjuvant to the bromide treatment, and should be thoroughly tried in all cases in which bromides or bromine are apparently contraindicated before they are discarded.—*Medical Record,* 1901, vol. lix., p. 46.

A New Remedy for Gout.—Dr. H. Sternfeld reports on having had excellent results in the treatment of gout by a new synthetic preparation, a lithium salt of chinic acid, and termed urosin by the manufacturers. The remedy is given in seven-grain doses three to six times a day and reduces the heat, redness, and swelling very quickly. The remedy is very sour, and should be put up in a form to protect the teeth.—*Münchener medicinische Wochenschrift,* 1901, vol. xlviii., S. 260.

On Hedonal.—Dr. E. Müller, assistant to Dr. Emminghaus at the Psychiatric clinic in Freiburg, says, *apropos* of this new hypnotic, belonging to the urethane group, he employed it in twenty-nine patients in all, making one hundred and twenty observations, using from seven to seventy-five grains. As it is soluble with difficulty and has a persistent taste it is wiser to give it in wafers or capsules. This delays its action somewhat, however, and to those patients who are not particular regarding the taste of their medicine it may be given with a minimum quantity of wine, soup, or cold water. The less the amount of fluid in the stomach the more prompt will be the action

of the drug. As to the dosage, it is wiser to begin with smaller amounts, seven to fifteen grains, and increase gradually. Sleep usually comes on in from one-fourth to one-half an hour in those rapidly influenced, while in others hypnotic action is not evident for from one-half to one hour. In some it fails to act even when given in seventy-five grain doses. The author concludes that for mild cases of insomnia it is a particularly valuable hypnotic, without any unpleasant by-effects, but as yet its high price makes it almost prohibitory. He compares it, for asylum work, with paraldehyde, in favor of the latter.—*Münchener medicinische Wochenschrift*, 1901, vol. xlviii., S. 383.

Treatment of Acute Dysentery.—Dr. W. J. Cruikshank believes that magnesium sulphate is a specific in the treatment of acute dysentery. He advises its administration in drachm doses every three hours, dissolved in one or two ounces of distilled water, to which should be added ten drops of the dilute or aromatic sulphuric acid. This medication should continue until the stools commence to take on a biliary character, when the medication should be withdrawn gradually. Three to six days is usually sufficient to establish convalescence.—*New York Medical Journal*, 1901, vol. lxxiii., p. 403.

On the Use of Formalin Administered in Glycerin.—Dr. Alfred C. Jordan speaks of the disadvantages of formalin in clinical work because of the intense irritation it produces, and makes the valuable suggestion that this difficulty can be overcome to a great extent by using glycerin instead of water as a solvent medium. A mixture of from 1 to 4 per cent. of formalin in glycerin will keep for several weeks, but it is best to prepare it fresh every once in a while by mixing one to five minims in two ounces of pure glycerin. The author has found it very useful in applications to the throat, as a mouth wash, as an application to the skin, and as an urethral injection in gonorrhœa. In this latter disease, however, while excellent results were obtained, there was much pain and swelling after the injection.—*Lancet*, 1901, vol. clx., p. 467.

Some Fallacies in Therapeutics.—Dr. George L. Peabody has contributed a critical paper on slavish adherence to antique therapeutic dogmas that have little or no justification in modern therapeutics. Thus on the question of bitters as stimulants to digestion he shows that they have almost no action whatever, and as now administered in the thousand and one " patents " and " proprietaries " any beneficial action, if present, is invariably due to the alcoholic menstrua in which the bitters are dissolved. He, moreover, " shows up " many of the so-called " tonics " which are nothing more than the equivalents of whiskey and brandy, containing as they do from 25 to 50 per cent. of alcohol. Boric acid is a drug with practically nothing but antiquity to help its claims as a useful agent. It is not a strong antiseptic, and is useless as a disinfectant for instruments, hands, or primary dressings of infected wounds. He also criticises the modern use or abuse of tannic acid. It does not cause contraction of vessels as so frequently taught, but rather a dilatation, and as for its use in diarrhœas it is practically inert,

being transformed into an alkaline tannate in the intestines, in which condition it does not precipitate albumin and is practically valueless. Claims as to its styptic or hemostatic effect on internal organs are therefore illusory and purely a matter of tradition. Ergot as a hemostatic in pulmonary hemorrhage he holds as of little or no service, the great increase in general blood pressure counterbalancing all value that might be derived by reason of its contracting capillaries. Moreover, it is very doubtful if it does contract those of the lungs. Lithium is a drug in which as a solvent of uric acid in the body he has little faith. Most lithium waters are valuable as potable waters, but the lithium present, even if of therapeutic value *per se*, is never present in sufficient quantities to be able to effect any such action. Potassium iodide is a much abused drug, its use being commensurate with our ignorance concerning its action. Its action in the attempt to remove chronic hyperplastic connective tissue formations he believes to be *nil*. Its use in lead-poisoning to aid in the elimination of the metal is unfounded on any scientific study. The author ridicules, and justly, the present prevalent modes of aërial disinfection of rooms, cars, etc. Chlorine and sulphur dioxide gases as frequently used are inefficient, and the attempts at disinfection are little short of being ludicrous.—*Medical Record*, 1901, vol. lix., p. 481.

OBSTETRICS.

UNDER THE CHARGE OF

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Pregnancy at Third Month; Fatal Peritonitis from Pus Discharged Through Fallopian Tube.—GOSSET and MOUCHOTTE (*Annales de Gynécologie et d'Obstétrique*, 1900, No. 19) report the case of a patient, aged twenty-six years, in the third month of her fifth pregnancy. She had suffered for some time from salpingitis upon the right side, and had been treated by curetting and external applications. She was seized with violent pain in the right lower portion of the abdomen, with a slight bloody discharge from the uterus. The symptoms pointed strongly to appendicitis complicating pregnancy.

On abdominal section seropurulent fluid of fetid odor was found in the peritoneal cavity. The appendix and surrounding tissues were covered by a pyogenic membrane, but the appendix was healthy. The uterus was three months pregnant; the right Fallopian tube was bathed in pus, and when freed from adhesions pus was seen oozing from the abdominal orifice of the tube. The tube and ovary of the right side were easily ligated and removed and the abdomen closed, with drainage. The patient died of exhaustion after aborting.

At autopsy, upon examining the tube, purulent peritonitis was found, the abdominal orifice of the tube being patent and pus passing freely from the tube into the peritoneal cavity.

[This case brings to mind the clinical fact that a latent salpingitis may become active during pregnancy, and that the infective focus in the tube takes upon itself increased virulence and activity. This case also demonstrates the fact that the tube remains patent in many cases of salpingitis, and that fluid may pass through this channel into the peritoneal cavity.]

Hæmatoma of the Abdominal Wall Complicating Pregnancy.—In the *Centralblatt für Gynäkologie*, 1901, No. 10, STOECKEL reports two cases of this unusual condition from the clinic at Bonn.

The first was that of a multipara who was admitted to the hospital at the seventh month of pregnancy. There was upon the right lower portion of the abdominal wall a tumor giving indistinct fluctuation, whose precise nature could not be ascertained. The urine of the patient was highly albuminous, and a few days after admission she had a profuse hemorrhage. On examination the os was found nearly dilated and a large placenta presenting. This was removed and a dead child extracted by version. After the patient recovered from her confinement the tumor was incised and found to be a hæmatoma. The clot was evacuated and the patient recovered.

His second case was that of a multipara attended by a midwife who thought the patient pregnant with twins. A tumor remained in the right lower portion of the abdomen after the birth of a child. The midwife attempted to extract a second child from the womb, but could find none. On examination a tumor of indistinct fluctuation was present. When the patient recovered from her labor this tumor was incised and found to be a hæmatoma. It seemed to be in the sheath of the rectus muscle, and was complicated by small points of hemorrhage from the surrounding tissue.

It is difficult to apprehend in these cases the active cause for the formation of the tumor. In the first patient pronounced albuminuria with degeneration of the placenta and hemorrhage were present and would explain a tendency to hemorrhage. In the second case the manipulation of the midwife in attempting to extract a second twin might have been the cause of the formation of the tumor.

The Use of Lysoform to Disinfect the Hands.—STRASSMANN (*Centralblatt für Gynäkologie*, 1901, No. 11) describes his observation upon lysoform as an antiseptic. In solutions of 3 per cent. it destroyed the most malignant bacteria in thirty hours. The bacillus coli communis was rendered incapable of growth in ten minutes by a 2 per cent. solution. In 3 per cent. solution lysol destroyed the proteus vulgaris as quickly as bichloride of mercury 1 : 1000. Lysoform in 5 per cent. solution was as active as 3 per cent. solution of lysol or 1 : 1000 bichloride of mercury. The staphylococcus pyogenes aureus and streptococci were destroyed by 3 per cent. lysoform in about the length of time required by bichloride of mercury 1 : 1000. At the expiration of two hours cultures of these bacilli placed in lysoform, 3 per cent., had been destroyed.

The advantage claimed for lysol and lysoform is that both are naturally

lubricant in their properties and that both leave the mucous membrane or the skin in a smooth and slippery condition. They are especially convenient in obstetric operations where delivery is made through the vagina for this reason. In the routine work of a maternity, where the hands are continually disinfected with soap and bichloride, they must become roughened and cracks and fissures result, which are a source of danger to patients and attendants as well. The lack of poisonous and irritant properties in lysol and lysoform makes them especially adapted for obstetric work.

Spontaneous Intrauterine Amputation.—In Rossthorn's reports (*Zeitschrift für Heilkunde*, Band xxi., N. F., Heft 12) KERMAUER reports the case of a child delivered by craniotomy through a contracted pelvis in brow presentation. Upon examination the great toe of the right foot had been amputated, and at the stump was found a radiating scar covered by a small crust. At the insertion of the cord upon the placenta there was a sac whose wall joined the sheath of the cord. This was an offshoot from the amnion, and had been the portion which adhered to the toe of the child and finally produced the amputation.

Two Cases of Cæsarean Section.—WILLIAMS (*American Journal of Obstetrics*, March, 1901) describes the case of a rachitic dwarf with eclampsia, who was at full term and practically in labor. Cæsarean section was performed and the child successfully delivered. The patient had no convulsion after delivery, and under the copious use of salt solution given beneath the skin she recovered.

His second patient was a pregnant woman in whom tumor of the uterus complicated the condition. Upon section the tumor was found adherent to the right horn of the uterus, and had become tightly wedged in the pelvis and adherent to the intestines. Adhesions were separated, a crucial incision was made into the uterus, and the tumor removed. Two additional growths of large size were found in the lateral wall of the uterus. The womb was accordingly emptied and a total extirpation made. On examining the larger tumor a cavity was found in its centre containing blood, pus, and débris. The mother and child made uninterrupted recoveries.

Pregnancy in a Rudimentary Horn of the Uterus.—In the *Archiv für Gynäkologie*, 1901, Band lxii., Heft 3, KRULL reports four cases of pregnancy in a rudimentary horn of the uterus. All four were treated by operation, and from these cases Krull makes the following observations:

He believes that uterus bicornis, with good development of the muscular and vascular tissue but with atresia or stenosis, comprises one of these classes of cases. The other class consists of those having a rudimentary development of one uterine cornu. In the first class should be included those cases which rupture after the seventh month or in which the patient goes to term or in which the fœtus is retained beyond the usual termination of pregnancy. In the first, second, and fourth of his cases the connection between the uterine rudimentary portion and the remainder of the womb was solid and impervious. In the first case the corpus luteum was on the side of the well developed portion of the womb, while in the second case it was on the same side

as the malformed portion. In the first case migration of the elements of conception had occurred. In the fourth case the situation of the corpus luteum could not be determined. In the third case the connection between the rudimentary horn and the remainder of the uterus was still preserved but narrowed, and the ovum had come from the same side as the contracted portion.

During pregnancy such patients suffer from severe pains in the lower abdomen and from vomiting, although in some cases these symptoms are not sufficiently grave to attract attention. Unless deciduous membrane is expelled ectopic gestation may not be suspected. In the first and third cases pregnancy went to its end without rupture. The first case came to its termination at eight months after the usual end of pregnancy. Rupture usually occurs in these cases between the third and fifth month, as illustrated in two of Krull's patients. In each case there was a mechanical reason for the rupture, either in violent exertion or in a mechanical injury.

Menstruation ceased in each case with the beginning of pregnancy, and decidua formed in the opposite side of the uterus in only one case. It was discharged at the end of pregnancy, while in one other case a membrane was discharged following a mechanical injury.

The point of rupture is usually at the highest portion of the fœtal sac. It is sometimes a circular tear. In diagnosticating these cases it is most important to recognize the band of connection between the uterus and the fœtal sac. The thickness and firmness of this band, its origin from the region of the internal os, distinguish this from other varieties of ectopic gestation. It is especially valuable to recognize an empty condition in the other side of the womb. The fœtal sac has limited mobility, and is but a little removed from the remaining side.

When diagnosis has been made the only treatment which offers a prospect of success is operation. In Kehrer's cases a general mortality of 82 per cent. was observed. The operation is sometimes difficult because it is not easy to control the pedicle, and hemorrhage may be copious. The operator may be obliged to remove the entire uterus. Krull's four cases recovered.

Version and Extraction in Contracted Pelves.—WOLFF contributes to the *Archiv für Gynäkologie*, 1901, Band lxii., Heft 3, an interesting paper upon this subject, based upon the results obtained in the Charitè Polyclinic in Berlin. The operation of version was performed 196 times in 6000 cases of labor. His paper is minute and extensive and may well be studied in detail by obstetricians. His conclusions are embraced in the following statements :

The maternal mortality of these versions was 5, or 2.6 per cent. The cause of death in these cases was as follows : Eclampsia, one ; anæsthesia, one ; rupture of the uterus, two ; septic infection, one. Death from rupture of the uterus or septic infection may properly, we think, be ascribed in some measure to the operation itself. The mortality from sepsis in these cases was 0.5 of 1 per cent.

The fœtal mortality was 48, or 24.5 per cent. When this is compared with the low fœtal mortality of some other forms of operation it must be regarded as excessive. Wolff describes those conditions most favorable for the performance of version in contracted pelves. They are as follows : The cervix

being fully dilated, the membranes must not be ruptured or must have been ruptured but very recently. If the cervix is not fully dilated it must be sufficiently so to permit the rapid extraction of the child. The internal antero-posterior diameter of the pelvis must be 8 cm. In addition to these points he draws attention to two minor points which influence the difficulty of the operation. A slight contraction in the true conjugate gives a better prognosis than a considerable lessening to 8¾ or 8 cm. The multiparity of the patient renders the prognosis for the operation much better, because the birth-canal is more easily dilated. There seems to be no essential difference in the prognosis in flat or symmetrically contracted pelves, provided there be room for the child to pass. Wolff draws attention to the great importance of choosing a favorable time for version. When the cervix is fully dilated and the membranes have not ruptured or have but very recently ruptured the chance is far the best. In 62 of the 196 operations the operator was fortunate in securing this combination of circumstances. The writer calls attention to Olshausen's warning, to avoid cases of extreme pelvic contraction or those of very slight pelvic contraction before the membranes have ruptured, because one can never tell accurately what the patient will accomplish in spontaneous labor.

In a series of fifty-eight cases which presented the conditions favorable for version, 98.3 per cent. of the children were born living. This result compares very favorably with spontaneous labors in the same class of cases.

GYNECOLOGY.

UNDER THE CHARGE OF

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Kraurosis Vulvæ.—JUNG (*Deutsch med. Wochenschrift*, 1900, No. 21) reports four cases treated by excision of the vulva. Microscopically no evidence of hypertrophy of any of the layers of the skin could be detected. As regards the etiology, the writer will not hazard an opinion, except that he is opposed to Veit's theory of previous inflammation due to excessive scratching. One case was complicated with carcinoma of the vulva, which was noted in six of the sixty cases reported in the literature, so that the coincidence is certainly not accidental. In one case a cure was obtained without operation by treatment with ointments and sitz baths and forcible dilatation of the narrow introitus under anæsthesia. A similar result was effected by Haller by cauterization with formalin, painting the vulva thrice daily with 50 per cent. ichthyol, and the use of compresses wrung out of hot water.

Herpes in Women.—LEWIN (*Deutsch med. Wochenschrift*, 1900, Nos. 17 and 18) observed 112 cases of herpes in 1584 gynecological patients, 83 being cases of herpes genitalis. In 23 the eruption occurred during menstrua-

tion, in 37 at the beginning of the flow, and in 49 after its cessation. In 17 patients it recurred regularly at the menstrual periods only. No close relation could be established between the development of herpes and pregnancy or the climacteric.

The writer's conclusions are opposed to those of Unna, that herpes genitalis is peculiar to prostitutes. He was unable to trace any connection between the eruption and disturbances of menstruation.

Hydrotherapy in the Treatment of Climacteric Disturbances.—GOTT-SCHALK (*Deutsch med. Wochenschrift*, 1900, No. 23), having been disappointed in the results obtained by the use of ovarian extract, has tried warm salt baths, with great benefit to his patients. After daily baths for four weeks he has noted marked relief of the flushing and sweats so common in women at the climacteric. He is opposed to Glaeveke's view that these disturbances are entirely independent of extirpation of the uterus. In his opinion the main factor is increased arterial pressure due to irritation of the vasomotor nerves. The hot flushes are preceded by a sensation of chilliness due to contraction of the surface capillaries, while the sweating results from dilatation of the vessels. The hot baths cause lowering of the arterial pressure by dilating the capillaries.

Torsion of Ovarian Tumors.—MANN (*Magyar Orvosi Archivum; Centralblatt für Gynäkologie*, 1900, No. 48) reports twenty-four cases of torsion. His own percentage of cases (28.9 per cent.) is high as compared with those of many writers, although the variation between Spencer Wells' statistics (2.4 per cent.) and Küstner's (38.8 per cent.) is great.

As direct causes of torsion he notes extreme mobility of the tumor, long, slender pedicle, ascites, and relaxation of the abdominal walls. As indirect causes he mentions violent exertion, sudden changes of posture, pregnancy and parturition, and the presence of a double cyst.

The writer agrees in the main with Thornton, accepting only one of Küstner's theories, viz., that tumors springing from the left ovary, but situated in the right side of the pelvis, are twisted from right to left, and the reverse with regard to left-sided growths.

Retroflexion without Symptoms.—E. SCHROEDER (*Centralblatt für Gynäkologie*, 1900, No. 49), from an examination of 411 gynecological patients, found retroflexion of the uterus in 25 per cent. without resulting local symptoms. He infers that persistent retrodisplacement is not necessarily a pathological condition.

Among the symptoms referable to this malposition menorrhagia is usually the initial one. In general the disturbances are due not to the displacement, but to complications.

Ultimate Results of Operation for Retrodisplacement.—COHN (*Centralblatt für Gynäkologie*, 1900, No. 49) in reviewing the statistics of the Breslau Clinic for five years found that 338 patients had been operated upon for retrodisplacement. Only 130 could be traced—39 cases of shortening of the round ligament, 65 of ventrofixation, and 26 of vaginal fixation.

In 91 per cent. a permanent cure was made at periods varying from one to five and a half years. Vaginofixation was limited to cases in which the patient had passed the climacteric. Shortening of the round ligaments was employed in cases of movable and ventrofixation in those of adherent retroversion.

Injury to the Ureter During Ovariotomy.—PHAENOMENOW (*Centralblatt für Gynäkologie*, 1901, No. 1) reports a case in which a piece of the right ureter was excised during the enucleation of an intraligamentary cystoma. It was impossible to perform uretero-urethral or uretero-vesical anastomosis, and the operator did not wish to suture the ureter in the rectum or abdominal wound. He accordingly ligated the upper end in two places. The patient made a smooth recovery, and seven months later had no urinary symptoms, so that it was inferred that the right kidney had undergone atrophy, as occurs in experiments on animals. The writer does not recommend this method of dealing with the injured ureter except in cases in which anastomosis is impracticable (?).

Entero-vaginal Fistula Following Vaginal Section.—CONDAMIN and VORON (*Arch. Prov. de Chir.; Centralblatt für Gynäkologie*, 1901, No. 1) analyze thirty cases of fistula, thirty involving the large intestine, five the small, and one the caput coli. The fistula may develop soon after operation in consequence of injury from instruments or during the separation of adhesions, or, later, due to sloughing of a raw surface on the gut, or injury to the mesentery. Less often the intestine may be directly cut or clamped while opening the cul-de-sac.

The presence of the fistula is indicated by the escape of feces into the vagina, its location being inferred by the character and amount of the discharge. Spontaneous healing is the rule, which may be hastened by cauterization of the edge of the fistula. It may be closed by lateral vaginal flaps according to Doyen's method, if accessible, otherwise it is necessary to perform cœliotomy. The operator in the latter case is aided by an assistant pushing up the fistulous tract with his finger per vaginam. After separating the gut and closing the fistula with Czerny-Lambert sutures a gauze drain is carried down through the vaginal opening.

Bacteria in the Urine.—PREDÖHL (*Centralblatt für Gynäkologie*, 1901, No. 2) reports seven cases in which he found the bacterium coli in the urine. He believes that the micro-organisms were in the blood, and entered the bladder secondarily. In consequence of some local irritation (cold, overdistention of the bladder, etc.) cystitis may arise, which often subsides without treatment. Salol is the best drug for internal medication.

Radical Operation for Carcinoma Uteri.—WERTHEIM (*Centralblatt für Gynäkologie*, 1901, No. 2) reports twenty-nine cases of abdominal hysterectomy for cancer of the uterus, in eleven of which there was glandular infiltration. Many of these affected glands were only recognized at the time of operation, the parametric tissues being healthy. The writer shows clearly that it is impossible to determine positively the condition of the glands and

broad ligaments until they have been examined microscopically, hence the rule to perform a radical operation in every case.

The mortality was high (nearly 40 per cent.), but with improved technique the time of operation was shortened from two or three to one and one-half hours. Especial difficulty was experienced in dissecting out glands adherent to the large veins. The ureters were first identified and drawn aside, when the uterine arteries were ligated near their origin. It was found that hemorrhage was not always controlled by provisional double ligation of the internal iliac arteries.

The writer raises the question whether in complicated cases it may not be preferable to implant the ureters in the bladder as a preliminary step. He believes that an important point in the technique is the final separation of the vagina and removal of the entire diseased mass from below (after suturing the peritoneal flaps over the detached uterus and closing the abdomen), thus avoiding all risk of sepsis.

Sufficient evidence has not been accumulated to allow of positive statements with regard to the ultimate results of this radical procedure. In view of its serious nature, the general condition of the patient must be carefully considered before attempting it.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Bullous Enlargement of the Middle Turbinated Bone (Concha Bullosa). —DR. J. PAYSON CLARK, of Boston, Mass., reports (*New York Medical Journal*, October 20, 1900) two cases, the morbid growth in one of which is illustrated by three wood-cuts, and he mentions two others upon which he had operated. He presents in continuation a summary of the subject with valuable bibliographic references.

[This affection seems to occur only in adults and principally in females. It is characterized by headache as a chief symptom, with gradual progressive sense of obstruction in the nose, sometimes interfering with free respiration. On examination the middle turbinate is found expanded into a smooth tumor of irregular contour which is composed principally of an enlarged ethmoidal cell or a series of cells. The only treatment is excision of the distended mass, and this is usually best done with the cold wire snare.—ED.]

Surgery of the Maxillary Sinus in the Eighteenth Century.—DR. J. BARATOUX, of Paris, communicates an interesting article (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, February, 1901) detailing

the various procedures employed in the eighteenth century (from 1718) for suppurative diseases of the maxillary sinus, since which time he claims that surgery of the maxillary sinus has remained stationary until the present day, except, perhaps, for the procedure of Dr. George Caldwell, who, in 1893, devised a method for draining the sinus through the nasal passages after curetting the morbid products through a temporary opening in the canine fossa.

Recurrent Tumor of the Tonsil.— *The New York Medical Journal*, October 27, 1900, contains a paper by R. P. LINCOLN, of New York, entitled " A Supplementary Report on a Recurrent Tonsillar Tumor," illustrated both macroscopically and microscopically. Nevertheless the diagnosis, as in the case of the original growth, remains obscure despite the careful examination of a number of histologists. The diagnosis lies between sarcoma, chronic hyperplasia, and syphilis, with strong leaning to the diagnosis of hyperplasia.

Adhesion of the Soft Palate to the Posterior Wall of the Pharynx Relieved by Operation.—DR. AUGUSTUS KOENIG, of Philadelphia, reports (*Philadelphia Medical Journal*, February 16, 1901) a successful operation in a Scotch machinist, aged thirty-four years, who, when eleven years old, had an ulcerated sore throat lasting eight months, in the healing of which adhesion took place between the soft palate and the posterior wall of the pharynx, completely closing the posterior nares. The communication between the nose and the mouth was scarcely enough to admit a retractor, and nasal breathing was almost completely abolished.

Under cocainization with a 5 per cent. solution, separation of the soft palate was begun with a curved pair of scissors and completed with a curette of Gottstein curve with a double lateral cutting edge. A gauze plug was employed for forty-eight hours, when it was replaced by a hollow silver plug especially made to fit the cavity, enabling the patient to breathe perfectly and preventing the freshly cut surfaces from reuniting. Healing took place in three weeks, and there has been no return of the trouble during the twenty months which have elapsed since the operation.

Complete Stenosis of the Larynx in Sequence of Intubation; Surgical Restoration of the Canal.—L. DE PONTHIÈRE, assistant to the Oto-Laryngological Clinic at the University of Louvain, reports (*Annales des Mal. de L'Oreille, du Larynx*, etc., 1900, No. 11) a case of complete stenosis of the larynx which came under the care of Prof. Debaisieux at the Hospital Saint-Pierre four years after the intubation. A child, aged two years, with serious laryngeal diphtheria, was intubated as a matter of prophylaxis and returned cured to his family eight days later with the tube removed. Progressive dyspnœa ensued in sequence of cicatrization, and tracheotomy became necessary which answered perfectly, although it had never been practicable to remove the canula on account of impending asphyxia. During these four years the patient had been chloroformed thirty-six times and submitted to as many operations without success. Laryngoscopic examination showed the larynx of small size, filled with cicatricial tissue covered

with mucous membrane. Thyrotomy was performed, the cicatricial tissue removed, and what is known as the chimney canula introduced ; after which, little by little, an artificial passage was formed through which the patient was able to speak, although it still remained impossible to do without an ordinary canula.

It is presumed that the treatment would require several years before any prospect of permanently removing the canula. The case seems to be unique in literature.

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A Suture of a Severed Trachea with Union by First Intention.—DR. E. S. GOODHUE, of Honolulu, H. I., reports (*Philadelphia Medical Journal*, January, 1901) the case which occurred in a Japanese laborer, aged thirty-nine years, who had endeavored to commit suicide and had completely severed the trachea between the second and third cartilages, so that the retracted portions were an inch or more apart. These were brought together with a chromicized suture of catgut, which included the inner and outer covering of the tube, and then the cartilages were tied together with three stitches, so that the approximated edges might be held as closely as possible. The external wound was closed with silk stitches upon a small drainage-tube, and the patient was sent to a hospital, where he did well, the wound healing in three weeks, all functions being carried on as usual.

Thirty-two days after the operation the patient ripped open the external wound, and Dr. Goodhue was able to look upon his reunited trachea, which appeared to be as good as ever, with the stitches fast disappearing. Some months later the patient was executed for murder, which he had committed just before his first attempt at suicide.

[In view of the difficulty encountered in holding together the retracted portions of a severed trachea, this method of procedure is both satisfactory and encouraging.—ED.]

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Continuous Sternutation of Seven Months' Duration Suddenly Relieved by the Application of an Apparatus for Straightening the Spine. —DR. MASSÉ, of La Rochelle, reports (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, February 2, 1901) this case. It occurred in a neurotic girl, aged eighteen years, who had occasionally complained of deranged digestion, often accompanied by headaches and facial neuralgia. In October, 1899, she was attacked with influenza, principally of a gastric type. This was followed by a dry cough, which ceased suddenly on December 15th, and was replaced by paroxysms of sneezing, which commenced at awakening and did not terminate until the moment of sleep. The paroxysms were repeated seven or eight times a minute, sometimes oftener, especially after eating. They were preceded by irritation in the nose, but were not followed by any serious discharge. Atmospheric conditions had no effect upon them. After a varied and prolonged course of ineffectual treatment it was noticed that the spinal column was bent forward, and that this gradually became more and more pronounced. Finally, an attempt was made to relieve this condition by an orthopedic apparatus, and upon the adjustment of the corset the paroxysms ceased abruptly and had not returned up to the date of the report.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Pathogenic Organisms in Milk.—Finding enormous numbers of strepto-cocci in a specimen of milk which had presumably been the cause of sickness in an infant, DR. D. H. BERGEY (*American Medicine*, April 20, 1901, p. 122) was led to examine specimens from other first-class dairies and obtained the same results in each case. These facts suggested questions as to the extent to which streptococci are present in the milk of healthy cows, whether they are more prevalent in that of herds kept under bad sanitary conditions, and as to their significance. Examination of a number of specimens gave posi-tive results in some and negative in others. The organisms were found somewhat more frequently in the milk of cows kept under unsanitary con-ditions, but the differences were not very marked. Of 40 samples of market milk, 36 (90 per cent.) yielded micrococci, and 20 (50 per cent.) yielded streptococci. Of 16 samples of mixed milk from one of the best dairies, only 1 yielded streptococci. Of 28 from another, 5 gave micrococci, but no streptococci. Fifteen samples from two other first-class dairies yielded streptococci in only two instances, but 11 contained micrococci. Eight samples from individual cows of first-class dairies, injected into the peritoneal cavities of guinea-pigs, caused death in three cases, and in each of these *Staphylococcus pyogenes aureus* was isolated from the organs. No strep-tococci were found. As to the significance of the presence of streptococci in the milk of healthy cows, nothing definite can be stated, but, judging from the results of experiments by Beck, Dr. Bergey believes it most probable that these organisms are not infrequently the cause of serious gastro-intes-tinal disorders in infants, and that this source of infection should always be taken into consideration when the cause of the sickness is not at once appar-ent. He advises that dairy owners should be cautioned regarding the danger arising from the hands of milkers having even slight lesions, since the entrance of such bacteria will, under favoring conditions of temperature, be followed by enormous multiplication.

During the first months of 1900, DR. E. KLEIN (*Journal of Hygiene*, January, 1901, vol. i., No. 1, p. 78) examined 100 samples of milk, taken in sterilized bottles from vessels directly from the country, primarily to deter-mine whether or not any contained the bacillus of tuberculosis. This organism was found in 7 specimens, but in the course of the investigation other pathogenes were detected, as follows: *B. pseudotuberculosis* in 8; *B. diphtheriæ* in 1, and a pathogenic torula, which produced a fatal disease of a chronic nature, in another. From the secretions of certain diseased udders

he isolated 2 pyogenic bacteria— *B. diphtheroides* and *Streptococcus radiatus* (*pyogenes*).

Under orders from the Minister of Agriculture to the Hygienic Institute of the Berlin Veterinary College, the head thereof, OSTERTAG (*Zeitschrift für Fleisch und Milchhygiene*, ix., pp. 168 and 221) undertook an investigation of the virulence and specific bacterial content of milk of cows which, though reacting to tuberculin, show no clinical evidence of tuberculosis. Separate samples and the mixed milk of 50 cows were tested by bacteriological examination, intraperitoneal inoculation of cream sediment, and feeding experiments with guinea-pigs, of which animals, during the inquiry, no less than 526 were used. Individual samples from 49 cows which simply reacted to tuberculin yielded no bacilli. From his results Ostertag concludes that the mixed milk of larger herds which react without clinical evidence of the disease may by chance contain bacilli without being able, to any noteworthy extent, to produce tuberculosis by ingestion ; and, further, that the milk of cows which give no clinical evidence may be considered as quite harmless. But with the milk of those with affected udders and of those which have become emaciated, the case is quite different. In no secretions of tuberculous cows are the bacilli so numerous as in that of the tuberculous udder. The most important measure for the prevention of dissemination of tuberculosis through the agency of milk is the weeding out of all cows with involved udders and of those which show emaciation, and this should be done by fortnightly veterinary examination. DR. LYDIA RABINOWITSCH (*Deutsch medicinische Wochenschrift*, 1900, No. 26, p. 416) reports absolutely negative results of examinations of mixed milk of large herds tested with tuberculin, while that of other herds which were under clinical supervision yielded, in a number of instances, virulent tubercle bacilli, which result emphasizes the great sanitary value of the tuberculin test.

Studies in Relation to Malaria.—DRS. G. H. F. NUTTALL, COBBETT, and T. STRANGEWAYS PIGG (*Journal of Hygiene*, January, 1901, p. 4) have made an extensive search for Anopheles in various parts of England, during which they collected specimens from no less than 173 localities, in many of which malaria has never existed at any time. Three species are found, the most prevalent being, as elsewhere, *A. maculipennis*. All three (*A. maculipennis, A. bifurcatus*, and *A. nigripes*) are to be found in all districts which were formerly malarious, as well as in others with no history of the disease. The investigations lead the authors to the conclusion that " the coincidence of the geographical distribution of ague and *Anopheles* as claimed by Grassi for Italy, and as probably holding good for other parts of the world, is hereby disproved for England, and consequently the generalizations are proved to be premature whereby he excludes other blood-sucking insects from being possible hosts of malarial parasites on the strength of this geographical agreement." Also, " the disappearance of ague from Great Britain does not depend upon the extinction of mosquitoes capable of harboring the parasites of malaria." Since the geographical distribution of Anopheles in England is wider than the former prevalence of malaria there, they conclude that numerical distribution of the insects is of greater importance than the geographical. The occasional occurrence of ague in out-of-the-way places

can, they believe, be explained by the existence of *Anopheles* in non-malarious districts without assuming the importation of infected mosquitoes from abroad, for the local insects may become infected by biting a malarious subject coming from other parts and then may infect healthy persons. The disappearance in England of ague depending not upon the extinction of *Anopheles*, is probably due to several causes operating together, namely, reduction in the number of the insects due to drainage of the land; reduction of the population of infected districts owing to emigration, thus reducing the number of infected persons who could infect the *Anopheles ;* and the reduction of the chances of infecting the *Anopheles* through checking, by the use of quinine, the development of the parasites in the blood of infected subjects.

Canned Meats.—From a series of experimental observations on the canning of meats, Drs. BISCHOFF and WINTGEN (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxxiv., p. 496) conclude that penetration of heat into the interior of the meat is uneven and not wholly dependent upon the size of the pieces. The condition of the meat, whether fatty or not, whether compact or fissured, is of much importance, as is also the amount of liquid in the can. The fissures are in part caused by the cooking, which converts the connective tissue to gelatin and brings about a contraction of the muscle substance. Evenness of quality, depending upon the age of the animal, the shape of the piece, and amounts of fat and connective tissue, is not easily controlled. In consequence of the high temperature necessary for complete sterilization, the meat becomes more or less stringy, according to the nature of the piece. Absolute sterility is obtained at different temperatures under varying conditions. The best results are obtained with cans containing 600 and 200 grammes by heating at 120.5° C. for seventy and fifty minutes respectively, the meat being tender, though somewhat stringy, and absolutely sterile.

Canned meats are not the equals of fresh meats as used in the household, but are to be preferred for use by troops in the field to that of freshly killed animals, consumed without undergoing any process of ripening. Moreover, they possess the advantage of easy transportation and quick preparation for use as needed.

Alcohol and Susceptibility to Infection.—The results of an extensive series of experiments on the influence of alcohol on susceptibility to infection, conducted by DR. TAAV. LAITINEN (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxxiv., p. 206) lead to the conclusion that under all conditions alcohol causes a distinctly increased susceptibility to experimental infection, whether it is given before or after or both before and after the introduction of the infective material, and whether it is given in a few large doses or in numerous small doses over a longer time, and whether with acute or chronic infections or pure intoxication. The animals (dogs, rabbits, guinea-pigs, fowl, and pigeons) employed received the diluted alcohol either by the mouth or injected under the skin.

The favoring influence of alcohol on the different morbid processes showed itself in the fact that the affection terminated fatally in the alcoholized animals, the controls being unharmed, or that at least the fatal result was appreciably hastened when both succumbed. With rabbits inoculated with

anthrax bacilli of diminished virulence, the former was the case; with guinea-pigs treated with diphtheria toxin, the latter was observed.

Alcohol was administered to a number of pregnant guinea-pigs for some days. Some aborted toward the completion of term; others gave birth to living young. The majority of the latter died before the tenth day, but those from mothers which had received but small doses remained alive longer. The survivors when experimented upon with diphtheria toxin showed a distinctly increased susceptibility in comparison with animals of equal age, the offspring of non-alcoholized mothers.

Observations of temperature showed no differences when the alcoholized animals had not been infected, excepting when such large amounts were given that the animal was almost in convulsions, when a decided fall was observed. After infection the alcoholized animals showed elevated temperature appreciably longer than the controls (averages, twenty-seven and twenty-four days respectively). The results of the research as a whole hardly justify the employment of alcohol in the treatment of infectious diseases in man.

Disinfection of Tuberculous Sputum.—According to DR. DONATO OTTO-LENGHI (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxxiv., p. 259) corrosive sublimate 5 : 1000, 7.5 : 1000, or 8 : 1000, with or without the addition of hydrochloric acid or salt, will disinfect dried tuberculous sputum with certainty when sprayed upon it, as will also a 10 per cent. lysol solution, but a 10 per cent. milk of lime is without effect. Formalin in 10 per cent. strength and chloride of lime in the same strength in powder form are ineffective against dried sputum. Chloride of lime in solution, however, appears to diminish somewhat the virulence.

Lysol, though equally effective with corrosive sublimate, is not equally available, on account of its much higher cost. Corrosive sublimate must be employed at least as strong as 5 : 1000, and the spraying must be carried out with a generous hand. When a room containing dried sputum is disinfected in this way, it should be tightly closed for some time after being sprayed, and all draughts prevented in order to prevent rapid drying of the sprayed surfaces.

The lessened efficiency of aqueous sublimate solutions with lapse of time and exposure to light can be prevented by the addition of a moderate amount of salt or of hydrochloric acid—not more than two molecules of salt to each of sublimate; thus, 2.16 grammes of salt to a 5 per mille solution.

In recommending sublimate as a room disinfectant, the matter of possible injury must be considered. Danger to future occupants has been repeatedly pointed out, and mercury has been detected in the urine of persons who have occupied for some months rooms that had undergone sublimate disinfection.

Plague and Rats.—A report on the epidemic of plague in Kobe and Osaka by Dr. Kitasato and others, abstracted by DR. M. J. ROSENAU (*Public Health Reports*, April 5, 1901), states that in two and one-half months the authorities of Kobe paid for 20,000 and of Osaka for 15,000 rats brought in dead or alive. Many more were found dead and disposed of without any claim for the official reward of 5 sen (about 2.5 cents) per head, because of the fear of compulsory disinfection that followed the finding of the dead animals. About a fifth of those found dead in Kobe and a tenth in Osaka were infected with *B. pestis*.

PATHOLOGY AND BACTERIOLOGY.

Punctiform Calcareous Bodies (so-called Calcified Glomeruli) of the Kidney Cortex.—BAUM (*Virchow's Archiv*, 1900, clxii., 85) has recently re-investigated, under the direction of Orth, the deposit of lime in the kidney.

Macroscopically the lime appears as small white lines and dots. Authorities generally agree that the lines are to be referred to its deposit in the tubules and in the interstitial tissue. Its situation, however, when it appears as points or dots has been a matter of dispute. Some have claimed that it was in the glomeruli, others that it was in the capsular space. Orth has recently expressed the opinion that it was deposited chiefly in the colloid contents of dilated tubules.

The writer investigated some twenty kidneys in which yellowish-white specks were more or less numerous in the cortex. Serial sections showed on microscopical examination two kinds of cysts present, although there was no evidence of chronic interstitial changes. The larger cysts were generally irregularly shaped, and their walls were lined in places with tall epithelium. The contents of the cysts were colloid. They were found both in the cortex and occasionally in the pyramids. The other cysts were round, about the size of a glomerulus, and confined to the cortex. The lining epithelium when present was low in type like that covering the capsular space of a glomerulus. Occasionally one or two loops suggesting a portion of a glomerulus projected from the wall. Evidently these cysts represent capsular spaces in which the glomeruli had not developed, and were to be regarded as congenital in origin.

It was found that the lime was deposited chiefly within these cysts in the colloid material filling them. It occurred as small granules and as concentrically layered masses. When fused together these masses formed a spherical ball. Only occasionally was calcification found to have taken place in a sclerosed glomerulus.

The Histology of Chronic Fibrous Pneumonia.—VOGEL (*Ziegler's Beiträge*, 1900, vol. xxviii., p. 179), working in Marchand's laboratory, studied ten cases of indurative pneumonia. Eight of the cases showed the organization of a pre-existing fibrinous intra-alveolar exudate. The two other cases showed a bronchial or a peribronchial inflammatory process which led to cellular infiltration and hyperplasia of the connective tissue of the lung. The end result of both processes is the same, namely, the replacement of the lung parenchyma by a more or less compact mass of connective tissue. In the first group of cases the newly formed connective tissue plugs contained in the alveoli enlarge and finally unite with the alveolar walls. In the second group the alveolar walls thicken and obliterate the alveoli.

The origin and development of the intra-alveolar connective tissue was investigated. When in acute pneumonia resolution does not occur the plugs of fibrin become retracted from the alveolar walls and clear spaces are formed in the periphery of the alveoli. In the first stage of the organization of the exudate, spindle-cel's are found on the surface and advancing into the interior of the fibrinous plugs, and spindle cells are also seen extending along the threads of fibrin which pass through Cohn's pores. Gradually, connective tissue replaces the fibrinous masses. The connective tissue fibrillæ form a loose network at first, which contains in its meshes many plasma cells. Later the connective tissue becomes more compact. The bands which pass through Cohn's pores and the strands which unite the plugs to the alveolar wall become thicker until wall and contents become blended into one mass of fibrous tissue. In one case the new connective tissue contained delicate young elastic fibres.

Cohn thinks that the connective tissue arises from the interlobular and subpleural tissue, because he found the most numerous and the most developed connective tissue plugs in the neighboring alveoli. Ribbert maintains that the connective tissue begins to form in the smallest bronchi and bronchioles, and grows peripherally into the alveoli. Vogel opposes both these views. His observations lead him to believe, with von Kahlden and Borrmann, that the organization takes place from the alveolar wall. Not all the fine threads which suspend the connective tissue plugs in the centre of the alveoli pass to other plugs through the pores in the alveolar wall. Some are united to the wall ; these he regards as primary outgrowths from the wall. Their delicate structure and the fact that they are found in the first stage of organization favor this view.

Vogel concludes that organization proceeds (1) from the alveolar wall into the fibrinous plugs ; (2) from one fibrinous plug to another by the growth of connective tissue through Cohn's pores.—J. H. P.

Histological Changes Produced by Freezing.—RISCHPLER (*Ziegler's Beiträge*, 1900, vol. xxviii., p. 541) reports at considerable length the changes produced in animal tissues by freezing with ether spray. In his experiments he utilized the ear and the thigh of the rabbit and the tail of the mouse, keeping each part in a frozen condition for three minutes. Thirteen animals were used in each series and the tissues examined histologically at periods from twenty minutes to eight days after the freezing.

Rischpler found that all tissues examined (epidermis, muscle, fibrous tissue, tendon, cartilage, bone, nerves, and bloodvessels), with the exception of elastic fibres, show changes under the influence of a lower temperature. The extent of the change depends on the degree of cooling and the resistance of the tissue, the latter varying with size, structure, position, and nutrition. The mildest form of change is the appearance of vacuoles and fine granules in the protoplasm. The next grade is characterized by a shrinkage of cell and nucleus, the latter assuming bizarre shapes. Then comes loss of staining reaction in the protoplasm, and finally the destruction of the nucleus and disintegration of the cell.

These changes are an expression of cell death, and in those places where they are very frequent lead later to tissue necrosis. They are caused by the

direct action of the cold on the tissue, and have no relation to thrombosed bloodvessels occasionally met, but the thrombi are due to these same changes affecting the bloodvessels. The injury is produced by the cold acting to abstract water from the water-containing components of the cell, and this water is converted into ice either within or without the cell. If this happens within the cell we find after thawing that the cell is made up of concentrated water—poor protoplasm, and of drops of water (in a stained section such a cell appears as a vacuolated cell) ; if without the cell, the cell and nucleus are found to be shrunken and distorted, while intercellular structures—e. g., protoplasmic bridges of the epidermis—are destroyed or distorted. Beside necrosis inflammatory changes follow as a result of the tissue injury.

Exudation with fibrin formation appears in twenty minutes, and peripheral position of the leucocytes in bloodvessels and their emigration are noted in three-fourths of an hour after freezing. The cells slightly affected regain their normal appearance ; those more seriously altered die and are replaced by regeneration from intact cells. The first signs of regeneration appear after six hours in the epidermis in the form of cells with large, constricted nuclei and multinuclear cells. These giant-cells are found also in the endothelium of arteries after twenty-four hours and in cartilage after three days. They are formed most probably by amitosis. After twenty-four hours mitotic figures are found in nearly all of the tissues. In muscle, regeneration begins in twenty-four hours, and many mitoses are found after three days. Regeneration progresses rapidly.—H. A. C.

The Presence of Fat in Pathological Tissues.—SATA (*Ziegler's Beiträge*, 1900, vol. xxviii., p. 461) gives the results of the examination of a number of pathological specimens with respect to the presence of fat. He finds that Sudan III. gives better results than the other fat-staining reagents. He fixes his tissues in formol and cuts sections with freezing microtome. The sections are dehydrated quickly in alcohol, stained with several changes of a saturated solution of Sudan III. in 95 per cent. alcohol, and mounted in glycerin. Sata insists on the necessity of studying both thin and thick sections. In struma, in the new-formed cells of inflammatory proliferation, in myoma, and in other pathological lesions he commonly finds fat present. In foci of necrosis there is usually a zone of fat droplets about the necrotic tissue. Their presence in the necrotic material is unusual, and when found their arrangement speaks for a previous existence in living cells. The same facts hold true for tubercular caseation, and as here the fat is absent in the early stages he thinks fatty degeneration has no causal relation to caseation.

In tumors in which no necrosis has taken place he very frequently finds great numbers of fat droplets, both in tumor and bordering stroma cells. The presence of fat seems to bear no relation to the age and nutrition of the cell. Connective tissue that has undergone a hyaline degeneration stains diffusely with Sudan III. In sarcoma cells fat droplets are not very common.

Sata thinks that the facts made out hardly support the view that the fat in these processes always arises through injury to the cell life in the sense of a fatty degeneration. He suggests that possibly in those cases in which necrosis is present the proteid has become so greatly changed that it can be readily broken down by the bordering cells, with the formation of fat. How-

ever, he does not deny that the living cell may be directly changed by chemical substances present in necrobiosis.—H. A. C.

The Occurrence of Lycopodium Spores within a Cancer of the Skin.— DE-MESER (*Virchow's Archiv*, 1901, vol. clxiii., p. 111) examined a typical epidermoid carcinoma from the arm of an old man, and saw in the tumor peculiar three-cornered bodies which proved to be lycopodium spores. Inquiry showed that the man had been in the habit of dusting the malignant ulcer with lycopodium powder.

The spores usually were found lying in the connective tissue stroma, either free in clefts between connective tissue cells or enclosed in the protoplasm of giant cells. Sometimes the bodies were lying among masses of epithelial cells, but were not within epithelial cells. At times the spores had penetrated one-third of the way through the tumor.

Hence De-Meser reviews the literature upon the power of absorption of granulating surfaces. This review showed that the power of absorption possessed by granulating surfaces varies with the condition of the granulating surface and with the material placed upon it. Under certain circumstances soluble substances (*e. g.*, alkaloids) or insoluble substances (cinnabar) or living organisms (bacteria) can be absorbed.

The lycopodium spores were too large to enter through the lymphatic spaces, and De-Meser believes that the spores were caught in the furrows of the granulating surface and then were overgrown by the cancer.

The case is important because numerous observers have found blastomycetes in cancerous tissue and have believed that these bodies produced the epithelial growth. But since it is proved that lycopodium spores can enter cancerous tissue it is certain that blastomycetes can enter in the same way, and may be present accidentally and have nothing to do with the causation of the disease. Moreover, a number of men have inoculated animals with blastomycetes and produced nothing but granulomata ; moreover, blastomycetes in cancers are few in number and have no regular relation to the cancerous process. Nor is the fact that blastomycetes are seen in the protoplasm of malignant tumors any argument that they cause proliferation of the epithelial cells, for blastomycetes have a limited power of motion, and in sarcomata the cells are of mesoblastic type, and hence may be phagocytic.— E. H. N.

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